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MERCHANT SHIP CONSTRUCTION DURING 1900.

Merchant vessels built in the United States and officially numbered by the bureau of navigation, treasury department, during the calendar year 1900, comprised 1,102 of 365,791 gross tons, compared with 954 of 267,542 gross tons during 1899. Steel steam vessels numbered ninety-two of 196,957 gross tons compared with eighty-six of 126,768 gross tons in 1899. The greater part of this increase is on the great lakes—from fourteen vessels, 50,836 tons in 1899 to thirty-three vessels, 108,511 tons in 1900. Steel steam vessels built on the Atlantic coast numbered fifty-one of 78,982 gross tons, compared with sixty-three of 73,808 gross tons in 1899. For comparison Wm. Gray & Co., West Hartlepool, England, built twenty-four steel steamships of 81,794 tons in 1900. Steel steam vessels built on the Pacific coast numbered six of 8,881 tons, compared with five of 553 tons in 1899. Wooden sail vessels increased from 523 of 86,125 tons to 575 of 99,460 tons; wooden steam vessels from 335 of 33,364 tons to 423 of 40,546 tons; steel sail vessels (including schooner barges) from ten of 21,385 tons to twelve of 28,828 tons. The foregoing figures do not include for either year unrigged canal boats and barges. Following are the tables for 1900 and 1899:

MERCHANT SHIPS BUILT IN THE UNITED STATES IN 1900.

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM.		SAIL.		STEAM.			
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross
Atlantic and gulf	459	74,093	176	12,980	8	11,666	51	78,982	694	177,721
Pacific	56	24,268	83	14,942	----	--------	6	8,881	145	48,091
Great lakes	6	118	45	4,182	4	17,162	33	108,511	88	129,973
Western rivers	54	981	119	8,442	----	--------	2	583	175	10,006
Total	575	99,460	423	40,546	12	28,828	92	196,957	1102	365,791

MERCHANT SHIPS BUILT IN THE UNITED STATES IN 1899.

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM.		SAIL.		STEAM.			
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic and Gulf	450	69,926	138	9,590	7	10,195	63	73,808	658	163,519
Pacific	38	10,386	71	9,148	----	--------	5	553	114	20,087
Great Lakes	20	5,458	33	4,610	3	11,190	14	50,836	70	72,094
Western Rivers	15	355	93	10,016	----	--------	4	1,571	112	11,942
Total	523	86,125	335	33,364	10	21,385	86	126,768	954	267,642

SIGNIFICANCE OF CARNEGIE TUBE PROJECT.

Recent announcements regarding plans of the Carnegie Co. for the further development of its steel and iron enterprises were said to have been made for the purpose of influencing the railroads in the matter of freight rates between Pittsburg and the seaboard, which have been a drawback to exports of iron and steel. It is quite probable, however, that there is nothing of this kind in the announcement that the Carnegie Co. is to erect at Conneaut, O., the largest tube works in the world. All that has been said of the purchase of land and arrangement of plans for the immense tube works is evidently true, and the first thought in this connection is not of an encouraging kind for the people of Pittsburg. This move on the part of the Carnegie Co. means more than the mere establishment of a tube works at Conneaut. It means that in departing from the policy of centering its manufacturing operations in Pittsburg, the Carnegie Co. has reached the conclusion that works of all kinds, not the manufacture of tubes alone, for the further development of its operations must be on the south shore of Lake Erie, the natural meeting point for all the materials that enter into manufactured products in iron and steel. Conneaut is all the more advantageous for the Carnegie Co. as a point of economy in manufacture, from the fact that coke from the Pittsburg district will furnish to the Carnegie railroad between Pittsburg and Conneaut return freight for thousands of cars that go down to Pittsburg loaded with ore but are now returned empty. It is quite plain, therefore, that the big tract of land secured at Conneaut will soon have a large share of the Pittsburg steel industry and in more ways than the manufacture of tubes.

It is said that the new works at Conneaut will stretch over a mile of the lake front and will be the most extensive and complete plant of its kind ever built. It will include all essentials in pipe and tube manufacturing, from the ore to the finished product. The general system of operation will be continuous; the ore being unloaded from vessels at one end and worked through the successive stages of iron and steel making in a direct line to the finished pipe and tubing at the other end. Electric power will be principally employed for driving the machinery. The blast furnaces to be built will probably exceed in size and capacity the two great stacks now being finished by the Carnegie Co. at Rankin.

Carnegie Co. officials and representatives of subsidiary companies will hereafter meet annually at a dinner in Pittsburg. The first dinner was held at the Hotel Schenley, Wednesday evening. The guests numbered about 100. Mr. Carnegie was unable to be present, but a very pleasant letter was read from him.

NOTES OF SHIP YARDS OF THE GREAT LAKES.

Although three large steel freighters have left the stocks in different yards of the American Ship Building Co. since the first of the month, and another is to be launched at Detroit in a few days, there are no idle berths and will be none for some time to come, as the places of the vessels launched are being taken by others under order that are not to be completed, in some cases, until September or October next. Officers of the company say it is too early yet to think of what may be done at the different yards after the big fleet now under construction is put into commission in the spring. It is quite probable, they say, that the demand for vessels on the seaboard will be such as to admit of quite a few freighters being built in parts for salt water service when the demand on the lakes falls off. The investing public is evidently taking interest in the stock of this company. Its common shares have advanced in price within a few weeks from about $20 to $35 a share, and the preferred, on which 7 per cent is guaranteed, holds to a point or two below $100. The third dividend of 1¾ per cent on the preferred for the present year is to be paid on the 15th. Books are now closed for this dividend. The advance in the common is probably due to the fact that unlike the common stock of other industries that of the American Ship Building Co. represents $20 a share actually paid in, and to the probability also that a dividend on the common stock will be paid with the close of the company's year in July.

At the American company's Lorain yard on Saturday last the second of two steamers of 6,000 gross tons capacity, building for Capt. John Mitchell of Cleveland, and others, was launched and named Walter Scranton in honor of the president of the Lackawanna Steel Co. The Scranton is 436 ft. over all, 416 ft. keel, 50 ft. beam and 28 ft. deep. She will have triple expansion engines, cylinders 23, 37½ and 63 in., with 42-in. stroke. Steam will be furnished by three Scotch boilers, 12½ ft. in diameter and 12 ft. long, to be allowed 180 lbs. of steam. She will be fitted with the Ellis & Eams induced draft system. Capt. Charles B. Gatlon, who has brought out a number of vessels of the Mitchell fleet, will sail the Scranton, and William Fetting will have charge of her machinery. Capt. Galton was in the steamer William E. Reis last season. Capt. M. P. Parsons, who was in command of the M. A. Hanna last year, will bring out the steamer John J. Albright, the other Mitchell vessel that is to go into commission in the spring. William Fritz will be chief engineer of the Albright.

Ship builders of the country are evidently still too busy to be bothered with building government dredges unless they are well paid for it. United States Engineer Handbury of Detroit, who is a member of the Mississippi river commission, is again having difficulty in obtaining bids within the limit set by congress for the construction of a steel hull, sea-going dredge, which is to be built under his direction. Last week he opened bids for the second time. The only bidders were the Bucyrus Co. of Milwaukee at $380,000 and the Iowa Iron Works, Dubuque, Ia., at $380,905.80. The congressional appropriation is $350,000.

David Marshall Whitney is the name selected for the steel freighter of 5,000 gross tons capacity building at Detroit for the Whitney Estate. The vessel will be launched Saturday, July 19. One of the eight steamers which the American company is to build for J. C. Gilchrist and others of Cleveland will be put down on the stocks to be vacated by the Whitney.

The first of the steel barges building at the West Bay City yard of the American Ship Building Co. for Mr. D. R. Hanna of Cleveland, and which is the barge engaged in the ore and coal trades between Marquette and Lake Erie ports, was launched on Thursday last and named G. A. Flagg.

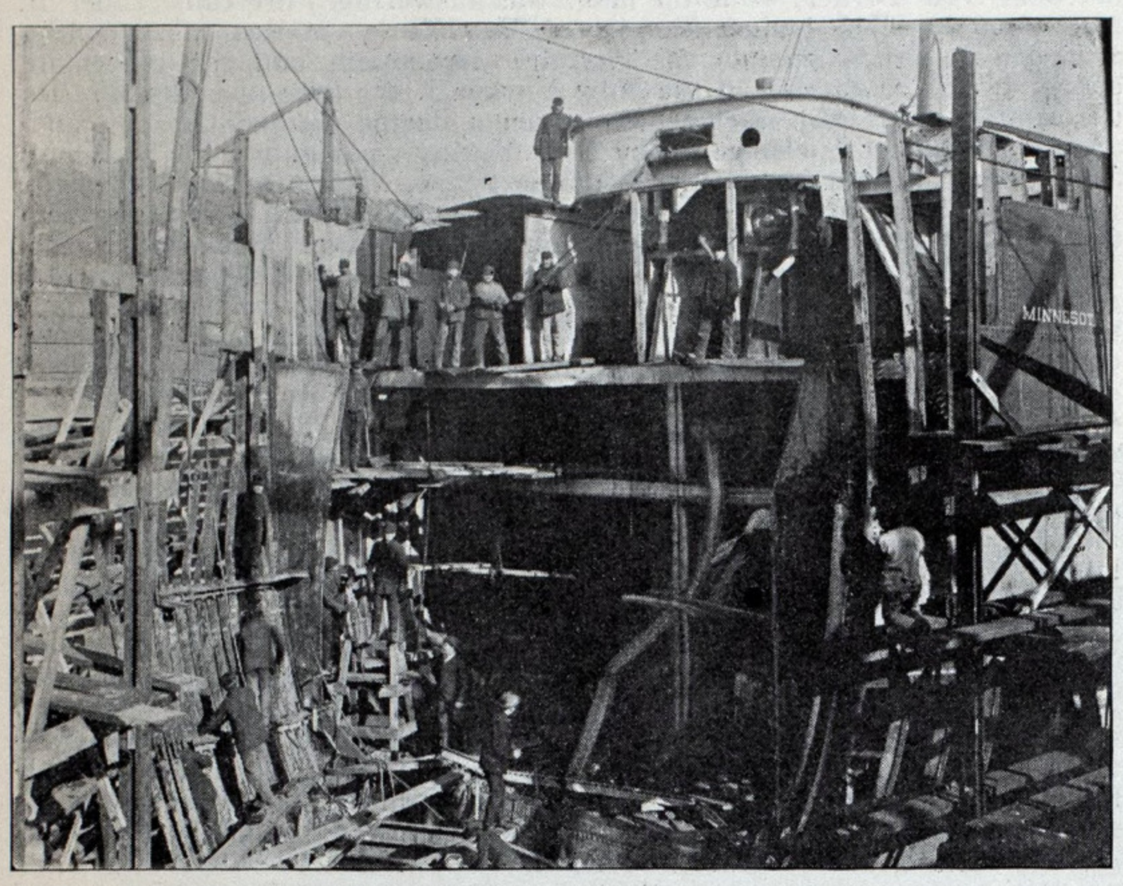
WORLD'S SHIP BUILDING DURING 1900.

An unusually full report of ship building operations during 1900 has been published by the Glasgow Herald. This report gives returns from British, British colonial and foreign ship builders, representing 1,925 vessels of an aggregate of 2,369,861 tons and 1,806,603 I.H.P., as compared with 1,860 vessels of 2,445,232 tons and 1,940,193 H.P. last year. To the grand total the United Kingdom contributes 1,237 vessels of 1,639,950 tons and 1,157,543 H.P. and foreign countries 688 vessels of 729,911 tons and 649,060 H.P. Scotland's share is 406 vessels of 541,031 tons and 478,936 H.P., England's 805 vessels of 961,426 tons and 611,007 H.P., and Ireland's twenty-six vessels of 137,493 tons and 67,600 H.P. In most of the large ship building districts in England and abroad there is a slight decrease, but in all the Scotch districts, with the exception of the Dee, there is an increase. The Clyde breaks all its own records by contributing 318 vessels of 492,609 tons and 447,428 H.P., as compared with 284 vessels of 491,074 tons and 478,503 H.P. last year. In the United States, which comes next after Germany among foreign countries, the production is somewhat uncertain, as no return was received from the Newport News Co., which launched 28.570 tons last year. In France the total is up by over 10,000 tons. There are also increases in Russia, Norway, Austria, Sweden and Canada; while the totals from Holland, Italy, Denmark, Belgium and Spain show in each case a decrease. The following table shows the total output of the year, according to the returns:

	1900			1899		
	Vessels.	Tons.	I. H. P.	Vessels.	Tons.	I. H. P.
Scotland	406	541,031	478,936	361	536,872	528,399
England	805	961,426	611,007	780	1,060,055	768,525
Ireland	26	137,493	67,600	21	131,723	96,280
United Kingdom total	1,237	1,639,980	1,157,543	1,162	1,728,650	1,393,204
Foreign and Colonial	688	720,911	649,060	698	716,582	546,989
Grand total	1,925	2,399,861	1,806,603	1,860	2,445,232	1,940,193

SCHOONER MARTHA IN DRY DOCK.

With the possible exception of the Pontiac, which was sunk in Sault Ste. Marie river in collision with the Canadian steamer Athabasca in 1890, the schooner Martha, which was sunk in Lake St. Clair in collision with the steamer E. P. Wilbur in October last, has the worst looking snout that was ever inflicted on a vessel. The Martha was bound down with a cargo of ore when the collision occurred. After several weeks work in



placing a bulkhead in the vessel and lightering about a quarter of her cargo, she was floated and towed to Lorain where she discharged her cargo. After she was unloaded she was towed to Cleveland and placed in No. 1 dry dock. From her stem 35 ft. back her plates and shapes were a mass of twisted iron and the work of cutting the damaged parts away was no small job. Some of the damaged material was cut away in chunks weighing tons. It could not be removed in small parts. It is estimated that with the wrecking bill the cost of repairing her will be about $60,000. The Martha is owned by the Minnesota Steamship Co. and was built in 1896.

DEATH OF JOHN GORDON.

In the death of John Gordon, which occurred at Buffalo last Thursday evening, the great lakes district loses one of its picturesque and progressive characters. While the later years of his life were somewhat clouded from a business standpoint, Mr. Gordon had been an active force on the lakes. He was born in Detroit in 1841. When eighteen years old he entered the employ of the Michigan Central Railroad Co. Two years later he became an employe in the Detroit postoffice, returning later to the Michigan Central, which he again left to take the position of purser on one of the Ward line boats. He rapidly acquired a knowledge of the lake shipping business, and in 1868 went into that business on his own account, buying the steamer Forest Queen and two other boats. In 1873 one of the vessels was burned and two others lost in the ice with no insurance on them. Mr. Gordon returned to the service of the Ward line as its agent in Duluth. In 1878 he bought two more vessels, the Manistee and Metropolis, which he sold in 1879 when he became the agent of the Lake Superior Transit Co. at Duluth. From 1880 to 1889 he was the Chicago agent of the Anchor line.

Mr. Gordon's greatest achievement was in inducing President J. J. Hill of the Great Northern Railway to place the two great steamships North West and North Land on the route between Buffalo and Duluth during the three months of passenger travel. These vessels were built by the Globe Iron Works at Cleveland at an approximate cost of $750,000 each. Gordon had been for years the manager of the Northern Steamship Co., operating six package freighters between Buffalo and Duluth and was in the complete confidence of Hill. Conditions arose after the construction of the passenger steamers which compelled him to resign the management of this Northern line in 1895, and he set about to organize the Union Transit Co. He disposed of his interest in this concern in 1896 and organized the Great Lakes Steamship Co., operating between Manitowoc and other Lake Michigan ports and Buffalo. This venture was not financially successful. The last three years of his life were devoted to the promotion of a company to operate a passenger service between Chicago and Buffalo. His idea was to put two swift steamships on the line and have them ready for operation by the time the Pan-American exposition opened in Buffalo in 1901. He approached the American Ship Building Co. with plans for the construction of the steamships, but the enterprise never got beyond the paper stage. In fact it is doubtful if the route outlined could ever be made commercially feasible from the passenger standpoint. One part of the scheme was to build the vessels in such a way that their cabins could be removed so that they might be used in spring and fall for the transportation of grain and package freight between Chicago and Buffalo.

Mr. Gordon is survived by a widow, who was Miss Elizabeth F. Wilgus of Sheboygan, Wis., and by three sons, F. B. Gordon, Robert Gordon of Buffalo, and John P. Gordon of Vancouver, B. C.

Quite a large foreign trade in capstans of the well-known Providence kind, is being built up by the American Ship Windlass Co. of Providence, R. I. Two of these capstans have just been furnished for the steel sailing ship Comet, building by Wm. Hamilton & Co., Port Glasgow, Scotland. for Montgomery & Co., London, and two more are to be shipped to the same builders for steel sailing ship No. 161, to come out in May for the same owners. The Providence company has also lately shipped a capstan, ordered by cable, to Liverpool, for the barkentine Enterprise.

MOVEMENT OF COAL, FLOUR, GRAIN AND LUMBER ON THE LAKES.

Everybody who has had to do with the collection of statistics dealing with commerce of the great lakes knows that customs house records are not reliable, on account of the shortcomings of laws relating to the arrival and departure of vessels. The customs house records are of an approximate kind and are interesting to that extent. The treasury bureau of statistics has been sending out of late reports of lake commerce made up from customs house statistics. They are printed in the Review for what they are worth. A complete report of the lake ore movement during 1900 (exact to a ton as it came from the dock managers) was printed in these columns a short time ago, and it would be useless therefore to publish the treasury department figures on that score, but a report of the department dealing with other commodities follows:

Chicago remains well in the lead as a receiving port for hard coal, a total of 678,094 tons having been unloaded on her docks. Milwaukee ranks second with receipts of 476,502 tons, and then come South Chicago and Duluth. In the neighborhood of two-thirds of the hard coal moved was sent from Buffalo, the shipments from that port aggregating 1,208,727 tons. Erie, Pa., the only other hard coal shipping port of any prominence, has had during the season a movement of 488,758 tons. The water transportation of soft coal presents radically different conditions. West Superior is at the head of the list of receiving ports, with a record of 1,270,183 tons. Milwaukee comes second with 726,044 tons, and Duluth is a close third.

By reason of the rail competition involved, the movement of flour by water presents some interesting features. There was transported by lake carriers during the navigation season up to Dec. 1 a total of 1,177,850 tons of flour. The heaviest shipments were from Duluth, which sent out 331,449 tons, and from her sister port, West Superior, with a total of 322,590 tons. Of the entire shipment of flour, 930,793 tons were unloaded at Buffalo.

The extent to which the great vessels on the nation's most important interior waterway are holding their own against the railroads as grain carriers is most strikingly evidenced by the showing made by the principal grain-shipping ports. A summary of shipments follows:

Ports.	Wheat, bushels.	Corn, bushels.	Oats, bushels.	Barley, bushels.
Chicago	15,222,610	47,114,149	13,958,064	221,534
Duluth	12,693,593	563,285	339,830	251,600
Milwaukee	844,397	3,713,409	5,545,644	4,517,151
South Chicago	4,250,913	12,849,621	3,061,203	193,150
West Superior	11,064,328	1,001,079	160,000	1,766,095

Buffalo so nearly monopolizes the unloading of this grain that it is scarcely worth while to consider the arrivals at other ports. The receipts at the elevator center at the eastern end of Lake Erie aggregated to Dec. 1 a total of 43,814,019 bushels of wheat, 57,175,069 bushels of corn, 26,133,424 bushels of oats, and 9,412,457 bushels of barley.

Almost every port on the upper lakes has this year made fairly heavy shipments of lumber, Duluth alone sending out 359,264 m. ft. Almost half of the total lumber movement was directed to either Chicago or Cleveland. The former city received 538,246 m. ft. and the latter port 430,320 m. ft.

Of the leaders in the movement of unclassed freight, Buffalo shipped 647,645 tons, and Chicago 402,889 tons. Chicago had receipts of 793,909 tons and Buffalo 652,872 tons.

From the standpoint of vessel movements Chicago is preeminently the leading port of the great lakes. A total of 7,099 vessels entered the harbor of the western metropolis up to Dec. 1. Buffalo, Cleveland and Milwaukee were close rivals for second place, as is evidenced by the records, which show 3,684 vessel entrances at Buffalo, 3,343 at Cleveland, and 3,057 at Milwaukee.

ASSOCIATION OF MARINE ENGINEERS.

Preparations are being made in Cleveland for the national convention of the Marine Engineers' Beneficial Association, to open Jan. 21. Some of the business of the organization will be conducted in open session. Officers of several different branches around the lakes recently elected are:

Cleveland—President, Henry T. McAuly; vice president, William Kelley; financial secretary, Henry Burton; recording secretary, William Clucas; corresponding secretary, L. D. Weeks; delegates to national convention, John Hayward and James Murray.

Detroit—Past president, Frank McDonald; president, Frank Seiler; vice president, J. N. Cretzinger; recording secretary, E. R. Dugan; financial secretary, Frank Kenyon; treasurer, Edward R. Blanchard; trustee, John M. Cronenwith; delegates to convention, Frank McDonald, Albert L. Jones and Thomas Tindall.

Marine City—President, William Densmore; vice president, Markus Hill; corresponding secretary, Harry Stone; recording secretary, David Foster; financial secretary, John Conley; treasurer, Frank Parker; delegate to national convention, Wm. Densmore; alternate to national convention, James Balfour; trustees, Harry Stone, Charles Burns and Brase Caswell.

Saginaw—Past president, Peter McLeann; president, Amandus G. Moll; vice president, R. Edward Nantell; corresponding secretary, Miles W. Gaffeny; recording secretary, George A. Thrasher; treasurer, John Henry; financial secretary, Walter A. Henry; chaplain, Joseph R. Hall; conductor, Alex Frazier; door keeper, Fred Pfluger; representative to national convention, Jos. R. Hall; alternate to convention, Miles W. Gaffeny.

Mr. Arthur Hawgood of Cleveland, who now has an office in New York and is looking after the Hawgood steamers Tampico and Eureka in the Atlantic seaboard trade, says that freights are now dull along the coast, but that unlike the lakes, the fluctuations are of a radical kind, and when vessels are wanted the rates are advanced by leaps and bounds in order to get them. Capt. K. A. Jensen, who took the Tampico from the lakes, had prepared himself so well for Atlantic navigation that he dispensed with the services of a "salt water man" after a trip or two. At last accounts he had left Vera Cruz, where he discharged a cargo of 2,700 gross tons of coal taken on at Norfolk. The Eureka has carried on the coast as much as 3,000 gross tons of coal and 400 tons of fuel.

FEDERATION OF LAKE SEAMEN.

A BENEFIT FUND, SUPPORTED LARGELY BY THE SHIP OWNERS, IS ITS MAIN FEATURE—THE SCHEME OUTLINED BY SECRETARY KEEP OF THE LAKE CARRIERS'—VESSEL MEN WILL BE BUSY AT DETROIT NEXT WEEK.

The coming week will be a very busy one for lake vessel interests in Detroit. Following the regular sessions of the Lake Carriers' Association on Wednesday and Thursday, the owners of lumber vessels will try to enter into an agreement whereby they may fare better in the matter of freights and handling charges than in the past. On Tuesday the Dry Dock Association of the Great Lakes will meet to fix dry dock charges. The docks are, of course, almost entirely controlled by the American Ship Building Co., but there is still outside the combination the Miller Bros. Dry Dock Co. of Chicago, Craig Ship Building Co. of Toledo, James Davidson of West Bay City, Dumford & Alverson of Port Huron, and Burger & Burger of Manitowoc.

On Tuesday, in advance of the opening of the Lake Carriers' meetings, the executive committee of that body will hold a final conference on the subject of assisting in the organization of a seamen's federation for the lakes, which has been talked of for some time past. The main feature of the federation will of course be the benefit fund which it is proposed to establish. Secretary C. H. Keep has given out some of the plans on this score in a letter which he has just addressed to the executive committee and to members of the association generally. Mr. Keep says:

"The tentative plans now being considered along these lines, provide for the payment to employes, who apply for membership in the fund, of a death benefit in case of death by accident arising out of their employment, and also the payment of a weekly benefit for a limited number of weeks in case of disablement arising out of service. The plan is to have the employe pay a certain fee for membership in the fund when he takes out his benefit book, and in addition a certain sum per month, the balance of the funds necessary to pay the benefits to be contributed to by the vessel owners; the vessels to agree to give preference in employment to holders of benefit books. The plan has been conceived in the light of the experience of railroad companies and other large employers who have found very beneficial results from the establishment of similar benefit funds. Unfaithfulness in service will forfeit the benefit book and all claim on the benefit fund. It is thought that a plan of this kind will gradually bring into the service on lake vessels a better and more permanent class of employes, and that when an employe has paid in a certain amount of money to the benefit fund, he will not lightly forfeit his claim on the fund. In connection with the establishment of this fund, it has also been suggested that it might be well to put the membership of the Lake Carriers' Association on a more permanent basis. The executive committee will meet at Detroit on Tuesday, Jan. 15, 1901, at 10 a. m. at the Cadillac hotel, for the purpose of considering the report of a special committee which is now at work preparing a tentative scheme for a benefit fund. Every member of the executive committee is earnestly requested to be in Detroit on Jan. 15, prepared to give the day and evening to careful consideration of the details of this plan. All members of the association, whether members of the executive committee or not, should feel themselves at perfect liberty to attend the executive committee meeting at Detroit on the 15th, and are cordially invited to do so. The importance of the matters to be considered justify the committee in asking the assistance and advice of the various members of the association."

AROUND THE GREAT LAKES.

Tonnage of vessels arriving at Milwaukee during 1900 was 1,639,309, against 1,730,191 tons in 1899.

Barry Bros. of Chicago have purchased the steamer Alice Stafford from Wm. Fitzgerald and others of Chicago.

The firm of J. G. Keith & Co., vessel agents of Chicago, has been dissolved by mutual consent, both members of the firm continuing in the business.

It is proposed by some of the vessel masters to have navigation rules similar to those in force on the Sault river apply to parts of the St. Clair and Detroit rivers. This matter, as well as some minor changes suggested for the Sault river rules, will be taken up at the annual meeting of the Lake Carriers in Detroit next week.

The official notice of changes in officers of the Minnesota Iron Co., already referred to in these columns, is as follows: "J. L. Greatsinger of Duluth is elected president of the company, to succeed D. H. Bacon, resigned, effective Jan. 10, 1901; C. P. Coffin of Chicago is elected vice-president; L. T. Beecher of Chicago is elected secretary, to succeed C. P. Coffin."

Welcome W. Hart, one of the old time vessel owners, died last week at Grand Rapids. He went to Detroit with his parents when quite young and shipped as a cabin boy on the steamer Albion, plying between Detroit and Mt. Clemens. Mr. Hart purchased the Albion later but disposed of her in a short time and took up the printing trade. Later he again embarked in the vessel business, owning several schooners.

Capt. M. Mulholland of the Bradley steamer Alva is meeting with wonderful success in the sale of the patent hatch fastener which he used on the Alva last season. He will probably find it necessary to quit sailing, in order to give attention to the business. More than 13,000 of the fasteners have been sold within three weeks for lake ships, most of them new vessels. The device is to be applied to the hatches of two steamers building at the works of the Craigs, Toledo, for service between Boston and the West Indies.

Capt. Enos J. Burke of Detroit (steamer Iroquois) is a friend of the men in the United States life saving service. He has worked for legislation in their interest. At a recent meeting of the Detroit lodge, Ship Masters' Association, he was presented with a handsome loving cup from surfmen of the life saving service. Capt. Alex McKay, president of the Ship Masters' Association, arranged a ceremony fitting the occasion. The cup was taken to Detroit by W. H. Batchellor of the Jackson Park life saving crew of Chicago, secretary of the surfmen's association.

Officers of Detroit harbor, No. 47, American Association of Masters and Pilots of Steam Vessels for the coming year are: Captain, B. F. Ogden; first pilot, W. Wilson; second pilot, John Sweeny; chief clerk, R. W. England; purser, B. McGregor; delegate to Washington grand harbor, Jan. 21, 1901, R. W. England; alternate, B. F. Ogden; chaplain, A. Reaume; port quartermaster, H. Fortain; star quartermaster, Frank Pratt; saloon watchman, Ed. Pichell. Capt. H. C. McCallum, the retiring captain, had held that position four years, or ever since the organization of the harbor.

A decision from the United States district court at Buffalo, Judge John R. Hazel, in the North Star-Siemens collision case, due to the sinking of the Siemens at Little Rapids cut in the Sault river Nov. 26, 1899, is awaited with a great deal of interest. The trial of the case at Buffalo just previous to the holidays resulted in warm arguments, in which some feeling that was not altogether comfortable was shown between Mr. W. C. Farrington of the Northern Steamship Co. and Attorney John C. Shaw on the one side and Mr. Harvey D. Goulder representing the Siemens on the other side. Mr. Geo. Clinton of Buffalo is associated with Goulder, Holding & Masten, representing the Siemens, and Brundage & Dudley of Buffalo with Shaw & Cadey of Detroit for the North Star.

Copies of the White law (rules of the road for the lakes) are constantly in demand and the United States hydrographic office has therefore included the law in a book of sailing directions for Lake Superior and the Sault river, just issued. This book is, from a lake standpoint, one of the most valuable publications of the hydrographic office. The sailing directions are corrected to date, and in addition there are some thirty pages devoted to variation of the compass, to the barometer, to United States life saving stations and weather signal stations, azimuth tables, draught in salt and fresh water, etc., etc. The book could not be made up and sold from a printing standpoint alone for $1.00, but as it is a government publication it sells at 30 cents. It may be had from the Marine Review.

Notice is given by the civil service commission that vacancies exist in the list of eligibles for positions of master, mate, first engineer and second engineer in the light-house service in the ninth district, which includes Lake Michigan and tributary waters. Vacancies also exist in the list of eligibles for position of superintendent in the light-house service in this district. One position will require a machinist who understands the construction and repair of boilers and machinery. The other positions will require a general knowledge of building construction, qualities of material, and ability to handle working force. Persons who wish to apply for these positions should obtain proper blank forms of application from the United States light-house engineer at the Custom House, Milwaukee, Wis., either in person or by mail, and after filling them out return them to the engineer.

Lake vessels operated from the office of Mitchell & Co., Cleveland, are controlled largely by three corporations—Mentor Steamship Co., Etna Steamship Co. and Cleveland Steamship Co. Officers and directors of these companies, elected a few days ago, are: Mentor Steamship Co.—Directors, Capt. John Mitchell, Capt. Alfred Mitchell, C. C. Hale, John F. Wedow, John C. Fitzpatrick; president and general manager, Capt. John Mitchell; vice president, C. C. Hale; treasurer, Capt. Alfred Mitchell; secretary, John F. Wedow. Etna Steamship Co.—Directors, W. H. Gratwick, John J. McWilliams and H. S. Holden of Buffalo and Capt. John Mitchell, Capt. Alfred Mitchell, John F. Wedow, C. C. Canfield, W. A. Canfield, H. S. Hills and W. F. Sauber of Cleveland; president and general manager, Capt. John Mitchell; vice president, W. H. Gratwick; treasurer, Capt. Alfred Mitchell; secretary, John F. Wedow. Cleveland Steamship Co.—Directors, Capt. John Mitchell, Capt. Alfred Mitchell, A. C. Dustin, Martin Mullen, Loftus Cuddy, Capt. J. H. Bartow, W. H. Gratwick; president and general manager, Capt. John Mitchell; vice president, A. C. Dustin; treasurer, Capt. Alfred Mitchell; secretary, John F. Wedow.

CARGO RECORDS—LAKE FREIGHT VESSELS.

The Review is asked to reprint the cargo records of lake freighters as corrected during the past season. They are as follows:

Iron Ore—Steamer William Edenborn, A. B. Wolvin of Duluth, managing owner, 7,446 gross or 8,339 net tons, Two Harbors to Conneaut; tow barge John Smeaton, owned by Bessemer Steamship Co. of Cleveland, 7,446 gross or 8,339 net tons, Duluth to Cleveland, draught 18 ft. 1 in.; tow barge Manila, Minnesota Steamship Co. of Cleveland, 7,300 gross or 8,237 net tons, Two Harbors to South Chicago, draught of 18 ft.

Grain—Steamer Simon J. Murphy, owned by Eddy Bros. of Bay City, 269,000 bushels of corn, equal to 7,532 net tons, South Chicago to Buffalo; steamer Superior City, A. B. Wolvin of Duluth, manager, 266,550 bushels of corn, equal to 7,463 net tons, South Chicago to Owen Sound, draught of 18 ft. 2 in.; steamer Douglas Houghton, Bessemer Steamship Co., 308,300 bushels of clipped oats and 60,000 bushels of corn, equal to 7,520 net tons, Manitowoc to Buffalo.

Coal—Steamer I. L. Elwood, owned by American Steamship Co., A. B. Wolvin of Duluth, manager, 7,688 net tons anthracite, Buffalo to Duluth; steamer I. L. Elwood, owned by American Steamship Co., A. B. Wolvin of Duluth, manager, 7,388 net tons of bituminous, Cleveland to Duluth.

IMMENSE BATTLESHIPS.

The British admiralty has decided to build two battleships which are intended to be the largest in the world. The distinction of having the largest warships has hitherto been held by Italy with the Lepanto and her sister ship, the Italia. Great Britain's two projected large warships, to be respectively named the Queen and the Prince of Wales, will be 2,000 tons heavier than the Italian ships mentioned, reaching the enormous displacement of 18,000 tons, which is 3,500 heavier than America's biggest armor-clad vessel. These tremendous British vessels will carry nothing larger than 12-in. guns. Their batteries will chiefly be composed of these guns and of seven 5-in. and 6-in. guns. The determination to increase the bulk of the battleships was only arrived at after much discussion, for since the days of the Royal Sovereign (of 14,150 tons), the admiralty has been inclined to favor battleships of smaller displacement, of which the Conapus (of 12,950 tons), is the best type. In the meanwhile Russia, France, the United States and Japan have all been increasing their displacements.

SHIP BUILDING ON THE ATLANTIC COAST.

The year just closed has produced some remarkable vessels on the Atlantic coast. The Sierra, Sonoma and Ventura, built by the Cramps for Spreckles' interests of San Francisco, are the largest vessels ever constructed on the Atlantic coast with the exception of the American liners. The American and Hawaiian, built at Roach's, are larger than the Mexico and Havana, built by the Cramps during 1899.

Of the seventeen sea-going steamships of 67,625 tons gross, built on the Atlantic coast, twelve of 47,930 tons gross were constructed on the Delaware river. The only square-rigged vessels built on this coast during the year were the steel ship Astral and the steel bark Kaimani, constructed at Bath, Me., by the late Arthur Sewall, but another steel square-rigged ship is being built there for the Standard Oil Co. Of the thirty-nine merchant schooners built on the Atlantic coast during the year, thirty-four were built in the state of Maine, one at Newburyport, Mass., one at East Boston, Mass., one at Milford, Del., one at Bethel, Del., and one at Pocomoke City, Md. Two of the schooners were six-masters—the only vessels of their kind in the world—the largest the Eleanor A. Percy, being able to carry 5,500 tons of coal, and the other, the George W. Wells, being able to carry nearly 5,000 tons. Six of them were five-masters; eighteen of them were four-masters and twelve of them three-masters, and only one of them—the C. B. Clark—was a two-master. The feature of the year was the building of one steel coal barge, the first of its kind to be built on the Atlantic coast for the exclusive carriage of coal. She is called the Powel, and was built at Port Richmond, N. Y., for the Sterling Coal Co. of Philadelphia. Six other steel barges were also built at Wilmington, Del., for the carrying of lime from Rockland, Me., to Atlantic ports and to return from coal ports with coal.

The following is the list of new seagoing vessels built on the Atlantic coast since Jan. 1, 1900. Tow boats, steam yachts, river and canal craft are not included.

STEAMSHIPS.

Name	Where built.	Gross tons.
Sonoma,	Philadelphia	6,253
Sierra,	Philadelphia	6,253
Ventura,	Philadelphia	6,253
Morro Castle,	Philadelphia	6,004
Hawaiian,	Chester	5,597
American,	Chester	5,591
Proteus,	Newport News	4,836
Comus,	Newport News	4,828
Pleiades,	Sparrows Point	3,753
Hyades,	Sparrows Point	3,753
San Juan,	Wilmington	3,503
Grecian,	Wilmington	2,827
James S. Whitney,	Wilmington	2,707
Thomas,	Sparrows Point	2,525
Manna Hata,	Wilmington	1,103
Chesapeake,	Wilmington	1,101
Major Barrett,	Wilmington	738

SHIPS AND BARKS

Astral,	Bath	3,292
Kaiulani,	Bath	1,570

SCHOONERS—SIX-MASTERS.

Eleanor A. Percy,	Bath	3,401
George W. Wells,	Camden	2,970

SCHOONERS—FIVE-MASTERS.

William C. Carnegie,	Bath	2,663
Helen W. Martin,	Bath	2,265
Fannie Palmer,	Waldoboro	2,258
Louise B. Crary,	Bath	2,231
Mary W. Bowen,	Bath	2,153
Van Allens Boughton,	Bath	2,129

SCHOONERS—FOUR-MASTERS.

Marie Palmer,	Bath	1,904
Maude Palmer,	Bath	1,745
Malcolm Baxter, Jr.,	Camden	1,732
Joseph B. Thomas,	Thomaston	1,564
Thomas S. Dennison,	Thomaston	1,491
George C. Thomas,	Verona	1,447
Edward T. Stotesbury,	Verona	1,446
Medford,	Bath	1,351
Calumet,	Bath	1,241
May V. Neville,	Bath	1,191
John E. Devlin,	Thomaston	1,107
Clifford N. Carver,	Bath	1,101
Edith H. Symington,	Newburyport	962
J. Edward Drake,	Bath	910
Geneva,	Rockland	874
Republic,	Thomaston	801
Thallium,	Verona	729
George May,	Milford, Del.	654

SCHOONERS—THREE-MASTERS.

Pendleton Sisters,	Belfast	798
Helena,	Bath	619
Future,	E. Boston, Mass.	613
Wellfleet,	Rockland	600
Ninetta M. Porcella,	Millbridge	591
Theoline,	Belfast	586
John W. Dana,	Phippsburg	556
Henry Weiler,	Phippsburg	400
Mary E. Lermond,	Thomaston	314
Sanandreas,	Pocomoke, Md.	226
Edwin & Maud,	Bethel, Del.	208
W. R. Perkins,	Millbridge	178

Also twenty-four small schooners between 100 and 150 tons gross, twenty-three of which are for the fishing trade, and one pilot boat; also a two-masted schooner, the J. B. Clark, of 194 gross tons, built at Brewer.

BARGES.

Indiana,	Bath	1,626
Havana,	Bath	1,617
Georgia,	Bath	1,609
Iowa,	Bath	1,606
Powel,	Port Richmond, N. Y.	1,204
R. & R. Lime Co. No. 1,	Wilmington, Del.	1,120
R. & R. Lime Co. No. 2,	Wilmington, Del.	1,120
R. & R. Lime Co. No. 3,	Wilmington, Del.	1,120
R. & R. Lime Co. No. 4,	Wilmington, Del.	1,120
R. & R. Lime Co. No. 5,	Wilmington, Del.	1,120
R. & R. Lime Co. No. 6,	Wilmington, Del.	1,120
Theodora Palmer,	Noank, Conn.	1,042
Shawmont,	Noank, Conn.	954
C. R. R. of N. J.	Noank, Conn.	953
Benavides,	Bath	924
Black Diamond,	Bath	923
Bee,	Bath	919
Grace,	Bath	877
Flora,	Bath	865
Elk Garden,	Bath	847
Virginia M. Palmer,	Noank, Conn.	840
Hampshire,	Bath	830
Remus,	Noank, Conn.	531
Eckley,	Perth Amboy, N. J.	495
Norton,	Bath	489
Sharon,	Bath	482

AMERICA—THE FUTURE WORKSHOP OF THE WORLD.

Charles H. Cramp in the New York World

The first half of the nineteenth century witnessed a development of ship building in the United States which, by the year 1850, had distanced all competitors. American superiority was universally acknowledged in the art of naval architecture, in the skill of workmanship and in the excellence of materials. During that period the United States was distinctly a maritime nation and her flag was, next to that of Great Britain, the best known in every quarter of the globe where navigable water touches the land. That period, however, was the last days of the era of wood and canvas—an era coeval with the human race itself—and the latter half of the nineteenth century witnessed the tremendous transition to steel and steam. Various causes, too vast and intricate for even mention in a paper like this, operated to put the United States almost out of the lists in this transition. The enterprise and energy of the nation were expended on its railways, and up to almost the end of the second half of the nineteenth century the sea was practically abandoned by the American people. This was inevitable, because the extent of land to be settled was so vast and the time in which it must be done so short that there could be no surplus of enterprise and energy for any other pursuit while the process was going on. But, although ship building as an industry stagnated almost to inanition, the art itself was still treasured in the few brains that survived the old regime.

So things stood until near the last decade of the nineteenth century, when the American people, by one of those national impulses that can neither be foreseen nor measured, resolved to resume their long-neglected rank as a sea power. Thus stimulated, the ship building industry in the United States not only revived, but gathered strength with a rapidity that astonished the world. When one reflects that the building of our new navy did not earnestly begin until about 1885, and that it did not attain full headway until about 1890, the results visible in 1901 become amazing. From absolutely nothing, in 1889, when the first of the new ships were commissioned, our navy has in ten years grown to be the third in the world in point of effective magnitude; and it is debatable whether, if tried by the test of ultima ratio, it would not actually prove to be the second. With exceptions not important enough to note, the great volume of construction involved in our new navy has been done by contract. This work and this alone has resuscitated the ship building industry in America to the point at which we now see it. The work that has been done for commercial account during the period of naval reconstruction has been of no benefit to ship building; if it has had any effect at all it is in the reverse direction. The foregoing describes in the broadest general terms the status of the ship building industry in this country at the beginning of the twentieth century. Its future is by no means an easy prophecy. As previously pointed out, the advance that has been made in the last decade or so has been due entirely to the patronage of the government in the construction of naval ships by contract; but naval work alone will not sustain the ship building industry of any country. There must be a limit to the production of fleets. The naval ship building program with which the new century opens in this country is the largest ever offered by any government, not excepting Great Britain, at any one time, to be built by contract alone. And yet this enormous volume of work will be out of hand within less than four years. It is not probable that this country will ever again launch so large a naval program at one time; a state of progress must soon be reached when the navy will be relatively complete and when, therefore, the only naval work of any consequence remaining in sight will be whatever new construction may from time to time be necessary to replace the strength of earlier built vessels that may become obsolete, together with the ordinary wear and tear of service. Manifestly then the ship building industry of the twentieth century must depend for good or ill upon the state of our merchant marine.

It is a common remark among people of superficial views that the United States must develop a great merchant marine in the immediate future for the simple reason that there is no other outlet for the national capital and enterprise. This belongs to the class of fallacies which always result from surface reasoning. Capital, no matter what may be its volume of unemployed surplus, will not seek unprofitable outlets. As the conditions stand, it is not profitable to operate steamships under the American flag in competition with European or Japanese ships. Our seamen demand higher wages and better fare than their European or Japanese competitors. There is also a difference in first cost against us, but it is a minor factor in comparison with the others. Unless these differences can be equalled the operation of American steamships must remain unprofitable in foreign trade. So long as such conditions exist there will not be an extensive demand for new merchant work in American ship yards.

SENATOR FRYE STILL SANGUINE OF SUCCESS.

Senator Frye is still sanguine that the shipping bill will pass the senate during the present session. He says that the senate steering committee intends to continue the measure in the legislative program until it has been voted upon, even if it becomes necessary to hold night sessions. Three amendments lately recommended by the maritime committee of fifteen will also be accepted by the committee on commerce. This committee has the bill in its care and it is believed by the majority of its members that these new amendments greatly improve the measure.

One of these amendments consists in the insertion of a clause in section 9 of the bill, which is designed to protect American vessels engaged in the transportation of cargoes to ports in Central America and Mexico. Under the provisions of the bill as originally reported, certain vessels were barred from the reception of the bounties prescribed by the measures, because a part of their cargoes was consigned to United States ports on the Pacific coast and the steamships were accordingly classified as engaging solely in the coastwise trade. As a matter of fact, only a small proportion of the cargoes of these vessels is sent to our Pacific ports, while the bulk thereof clearly comes under the classification of foreign trade. The other two amendments are in section 13 of the bill, prescribing the conditions under which owners of vessels may be permitted to enjoy the proposed subsidies. As the bill was originally framed all the owners of the vessels were required to give bonds to the United States treasury, agreeing to build new vessels within five years, aggregating at least 25 per cent of the tonnage of those already in existence. Inasmuch as the ownership was often complex, it was found that this provision would be impracticable and it has been, therefore, decided to make this requisite apply only to a majority of the owners. Further to simplify this section, the secretary of the treasury is authorized in its amended form to retain 25 per cent of the compensation from time to time earned by those entitled to such subsidy as security for the performance of the obligations assumed in the bond.

A new section is added to the bill defining "gross tons" as provided by section 4153 R. S. As for the foreign-built steamships admitted to subsidy under the bill, against which some objection has been urged, Senator Frye states that it is absolutely certain at the outside this class of vessels amounts to not more than 300,000 gross registered tonnage. Senator Frye will not foreshadow the result in the house, but he has no concern whatever in regard to the fate of the measure in the body over which he presides.

"I can find no factious opposition to the bill," said Senator Frye, "notwithstanding the report that filibustering tactics were to be resorted to by its enemies, nor do I look for prolonged discussion. Not more than four or five speeches remain to be made on each side and arrangements will be made whereby these speeches can be delivered in a night session, if necessary. The army appropriation bill will doubtless be passed by the middle of the current week. The shipping bill will then be made the unfinished business and will have the right of way, but there will be no disposition on the part of its friends to antagonize the regular appropriation bills as they may be presented. The opposition to the bill is clearly traceable to the foreign shipping interests and when the time comes for taking a vote, it will be found that a large majority for the measure is assured. The amendments recently decided upon will certainly tend to facilitate the success of the bill, as they remove all legitimate sources of objection from all those who have American interests at heart."

NARROW ESCAPE OF SHIP AND CREW.

The following letter from Mr. H. Coulby of Pickands, Mather & Co needs no explanation. It tells its own story and shows that the men in the fire room of a vessel cannot be too careful:

"One day during the past fall, while our chief engineer, Mr. A. Arnold, was on the steamer Appomattox, he happened to be in the fire hole and saw a fireman with a can on his shovel and some coal, just about to throw it into the fire. Mr. Arnold told the fireman to stop and see what was in the can. They took it off the fireman's shovel, and upon examination it was found to contain blasting powder. It was very fortunate for the boat, and people on her, that Mr. Arnold happened to be there and prevent the fireman throwing the can into the fire box, otherwise it would undoubtedly have blown up the steamer. The can was about the size of a gallon can, nearly full of blasting powder; and upon investigation it was found to be a can used by the coal miner for carrying his blasting powder. Evidently in the falling of coal in the mine the can had been covered up, shoveled into the tram car and shipped to the lake front in a car of coal, which car was dumped on the Appomattox as fuel coal. We think it would be well for you to publish this incident, as a caution to firemen to be very careful and not throw into fire boxes anything that happens to get onto the shovel. It was a narrow escape for the boat and the lives of the men on her."

CONTRACT FOR THREE SHEATHED BATTLESHIPS.

Secretary Long wrote letters this week to the Newport News Ship Building & Dry Dock Co., the Bath Iron Works and Moran Bros. of Seattle, informing them of his decision to award each a contract for building a sheathed and coppered battleship under the conditions prescribed by the navy department. The chief interest in these bids centers in that of Moran Bros. Their price was beyond the limit of cost fixed by congress, but the law on the subject makes it imperative on the secretary to award the contract for one vessel to a firm on the Pacific coast. Mr. Long tendered the contract to Moran Bros. at $3,511,000, plus 4 per cent., the bonus allowed Pacific coast bidders on account of the cost of transporting material across the continent, thus making the amount of the contract $3,651,400. The sum of $3,511,000 was fixed by deducting from the limit price, $3,600,000, a sufficient amount to cover the cost of inspection, supervision and coppering, Secretary Long having determined that these things must be paid for out of the appropriation by congress. It is believed at the navy department that Moran Bros. and the two other firms will accept the department's proposals.

The Harlan & Hollingsworth Co., Wilmington, Del., expects to receive a contract for the construction of a ferry boat similar to the Philadelphia for the Philadelphia & Kaign's point traffic in connection with the Philadelphia & Reading railway.

LARGEST BOILER WORKS IN THE WORLD.

OPENED WITH THE DAWN OF THE NEW CENTURY—DESCRIPTION OF THE NEW BOILER PLANT OF THE BABCOCK & WILCOX CO. AT BAYONNE, N. J.

With the beginning of the new century, work was started in the new boiler works of the Babcock & Wilcox Co. at Bayonne, N. J. The engine was started at midnight, at the dawn of the new year, in the presence of the mayor of Bayonne and a number of the city officials and the officers and heads of departments of the Babcock & Wilcox Co. Operatives went to work at once in the drum shop, which is the first department to be put in operation, and in the presence of the guests a steam drum was completed out of the flat sheets. Those present witnessed all the operations of shearing, punching, rolling, riveting and assembling involved in its manufacture. Supper was served to the guests and toasts were drunk to the success of the new plant.

The new works of the Babcock & Wilcox Co. are located in Bayonne, where the company has purchased thirty acres of land, having a frontage of 650 ft. on the Kill von Kull, with a depth of water 25 ft. on the pier line. The plant is the largest of its kind in the world. The buildings completed have a floor area of about 160,000 sq. ft., to which will be added at once buildings of approximately 40,000 sq. ft. floor area. The plant is equipped throughout with special tools, and has been designed with the greatest care to expedite the processes of manufacture by reducing to the last degree the needless handling of material and by the use of the most approved appliances.

The business of the Babcock & Wilcox Co. is over thirty years established, beginning with the partnership existing between Babcock & Wilcox in the manufacture of engines in the early sixties. The first boilers were built by them in 1867. The partnership was changed in 1881 to the present corporation. The works of the company have hitherto been located on grounds leased from the Singer Manufacturing Co. in Elizabethport, N. J., but the enormous growth of the business in later years made necessary an increase in productive capacity, and in 1899 the company decided to build the new works now nearing completion.

The site chosen is an ideal one. So large a tract of land with so desirable a water frontage close to New York city is exceedingly difficult to obtain, and in most instances such a manufacturing site can only be obtained by filling in soft marshes fronting on the water. The site occupied by the Babcock & Wilcox Co. is remarkable in that it consists wholly of solid ground, no piling having been used for either the buildings or the heavy foundations required for the machinery installed. A spur track from the Central railroad of New Jersey enters the property, so that the company enjoys the best facilities for shipping both by rail and water.

The water tube boilers manufactured by the Babcock & Wilcox Co. have a world-wide reputation. The success of the water tube boiler dates from the first boilers of their manufacture. In addition to the enormous business which they are doing in stationary boilers the company has in the last few years entered into the manufacture of marine water tube boilers which are now exclusively used in the United States navy, are being introduced in the British navy, and are very widely used in the merchant marine.

BOSTON CUP DEFENDER.

A few friends of Thomas W. Lawson and Designer B. B. Crowninshield have seen the designs for the Boston cup defender and are highly impressed with the model. They have talked a little in club circles and a general idea of the lines Crowninshield is working on can be easily figured out. Instead of building an enlarged Jolly Roger or Hebe, which were his two successful boats of last season, Crowninshield has taken the model of the Columbia as far as he has been able to and the new yacht is to be an improvement of the latest Herreshoff crack, so that Crowninshield and Herreshoff are working on the same lines. Herreshoff here has an immense advantage. His experience in the construction of the Vigilant, Defender and Columbia makes the work on the new yacht comparatively easy, while Crowninshield has no data on which he can rely and has to work out every little detail. For this reason many think that a mistake has been made in trying to beat Herreshoff with a type of boat that the Bristol man has developed so successfully. The Lawson boat will be beamy, more beam than the Columbia, and by getting so much initial stability in the hull proper the boat will need less lead on the keel. The boat will be sparred to the limit, the estimated spread of canvas being 14,000 sq. ft., which is 700 sq. ft. more than the Columbia carried, and her displacement will be much less than the champion of 1898. The overhangs on the Boston model are long and low, and with a very slight angle of heel her waterline length will be increased considerably. The bow is full, and the underbody is not cut away as much as that of the Columbia. The lead keel appeared to be longer than that of the Columbia and the draught of the new boat somewhere about 20 ft. The hull proper is very short draught and the floors very flat. In constructing the boat a different method will be adopted from the Bristol style. No lead keel will be cast. Plates will be bent to the shape of the keel and form a sort of trough. The keel will be set on the top of this trough and the frames set up on this plate. The trough will be filled with pigs of lead and then molten lead will be run in to fill in the spaces around these pigs and to hold them in shape. The rudder will not be hung on a skag, but on the stern post, which will rake at an angle of about 45 degrees.

TRIAL TRIP OF THE ILLINOIS.

A dispatch from Newport News announces that the battleship Illinois, sister of the Alabama, just turned out by Cramps, and the Wisconsin, just completed by the Union Iron Works, will go out on her builders' trial trip Feb. 13, according to the present arrangement. The completion of the Illinois has been considerably delayed by the failure to receive armor. The turret armor is still to come from the factory. In view of the fact that the Wisconsin and Alabama both made high rates of speed, the builders' trial and official trial of the Illinois will be watched with interest. The builders will undoubtedly push her to her best on the builders' trial. Officers for the Illinois have not yet been assigned. No captain has reported for duty in connection with the work on the ship. Captains Folger and Chester were at Newport News nearly a year before the Kearsarge and Kentucky went out.

MARINE REVIEW

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To All Old Sailing Masters on the Great Lakes.

The Marine Review is desirous of obtaining the experiences of old sailing masters on the lakes and the histories of the old vessels which they sailed, together with photographs or pictures of them and their craft. These old sailing masters and their vessels are a part of the history of the great lakes which is fast becoming obliterated by the revolution in lake transportation. This history is of a perishable nature because it exists largely in the memories of men who have spent the greater part of their lives on the lakes. If it is not preserved now it never will be preserved. The Marine Review therefore begs old captains and mates and vessel owners to write a brief account of their lives, their experiences on the lakes and the histories of the vessels upon which they sailed. The Review will both publish and pay for the matter. Never mind spelling, punctuation and diction; the Review will furnish those; just relate the facts. The Review hopes that every old sailing master will take this as an appeal to him personally and jot down during his winter evenings a rough sketch of his life. For instance, but little is known about Lake Superior navigation prior to the opening of the Sault Ste. Marie canal. Who knows about it? Has anyone any pictures of the vessels afloat on Lake Superior at that time. If so, send them to the Review to be photographed and they will be promptly returned in good condition. By the same token, does anyone know of the first steamboat line that ran between Detroit and the Sault?

Representative Charles H. Grosvenor has introduced a bill in the house of representatives to amend the law governing the use of the steam craft in such manner that its provisions shall apply to all boats propelled by gas, fluid, naphtha or electric motors which are used for hire. The law as amended not long ago so as to apply to vessels propelled by gas, electric and naphtha engines, provides for the employment of licensed engineers and pilots and compliance with the requirements of United States government inspection for craft of 15 tons burden or larger. The amendment offered by Mr. Grosvenor proposes to strike out this limitation of size and bring under such provision all craft used for profit or hire. Legislation tending in this direction, or to the extension of the complete law now governing the use of steam vessels, has been attempted at intervals during the past ten years without any show of success, until in the last instance when the present law was passed. Owners of electric, gas and naphtha launches made no remonstrance to the present law, as its scope was so restricted by the clause which the Grosvenor bill proposes to revoke. The Grosvenor bill, if passed, would work a great hardship to merchants engaged in a small way along river and harbor fronts. A small launch for the quick delivery of packages is absolutely essential to their business. It is absurd to claim that it is necessary for the merchant to employ a licensed engineer and pilot to operate such a craft. Such a measure would put him out of business, for it would more than consume his monthly profits. He could not afford to hire an engineer and pilot and, were the law enforced, he would have to deliver his goods in a rowboat. There is another element of danger in the Grosvenor bill. Should it pass it would be but a step to revoke the clause now confining the scope to boats used for hire and thus bring all power craft under the necessity of employing licensed engineers and pilots in their operation. The great majority of owners of craft who now derive much pleasure from that source of recreation would prefer to sell their boats rather than to submit to the imposition of such a law. It is quite probable that Mr. Grosvenor has introduced the bill by request without comprehending the exact situation, but doubtless under the impression that it would benefit the people at large. It would really work an injury to the people at large; and is moreover a serious interference with personal rights. A man certainly should have the right to invest in a little naphtha launch without putting an engineer and pilot upon his pay roll forever.

The river and harbor bill, carrying the list of appropriations mentioned in the last issue of the Review, was presented to the house of representatives on Wednesday. Mr. Burton made a masterly exposition of the bill and was cheered by his colleagues in the house. Several attacks were made upon the measure by members who thought that they had not fared well enough and others who thought that the great lakes were faring too well, but Mr. Burton was enabled to meet their arguments. It is quite likely that the bill will pass the house in much the shape in which it is presented. An interesting incident in the debate in the house was the presence of Senator Hanna, who, it is represented in the press, will attack the provisions of the bill which apply to the extension of the Cleveland breakwater. It is given as the senator's opinion that the government should provide merely for a harbor of refuge and for nothing else. If this be correct, the Review believes that the senator takes a somewhat too restricted view of the case. The battle of the cities along the lakes is on. The south shore of Lake Erie is going to be the future fighting ground of the great industrial organizations. Particularly is this true in its relation to iron and steel making and its subsidiaries. That city is going to win which has the greater accommodation. The Review hopes to see the day when the entire stretch of lake front from Waverly avenue to Gordon park will be literally teeming with industries, each with a waterway to a convenient dock. The first requisite to obtain this condition is an adequate breakwater. It would come with sorry grace indeed were Cleveland deprived of its industrial prestige through its own senator.

Chicago owns very few vessels, but in the little group of men on the Board of Trade that look after lake freights and insurance on millions of bushels of grain moved by the water route to Buffalo from the western metropolis there is as much brain and business ability as can be found in any other branch of the lake trade. One of this group drops the Review a line regarding Capt. D. Sullivan's announcement that he has taken up business on his own account. He says: "Capt. Sullivan has gone into business with his son at No. 2 Sherman street, under the name of Sullivan & Co. No man stands higher on the Board of Trade than does Sullivan, and he is one of the brainiest vessel agents ever on the floor. Besides this, he belongs to the generation of vesselmen who do not squeeze their pennies in their business. He is a generous, whole-souled fellow, thorough, painstaking and upright in business, and worthy of anything that may be said in commending him to the vessel interests."

A late report from the Suez canal directors shows that during 1899 there passed through the canal 3,607 vessels, representing an aggregate burden of 9,895,630 tons. This is a gain of 104 vessels and 657,017 tons over the previous year. Only 327 vessels passed through the canal for the first time. Vessels passing through the canal under quarantine are compelled to avoid any contact with the land, and must stop at night if not provided with electric headlights. Over 90 per cent of the vessels going through were properly provided with headlights, and their average time was 15 hours and 41 minutes. Although in 1898 over 94 per cent of the vessels were fitted with headlights, the average time for boats so provided was two minutes longer than in 1899.

The American Highway & Steamship Co., which was recently formed in New York, proposes, according to incorporation papers, to go into the ship building business and to carry on a general marine freight traffic. The ship building feature of the incorporation papers is probably inserted simply for the purpose of enabling the company to take up ship building if it is thought advisable to do so. The capital is $2,000,000 and in addition there will be an issue of $2,000,000 of bonds. Funds from the sale of bonds will apply upon the construction of ships and the bondholders will be secured by mortgage and insurance on the ships. The vessels which it is proposed to build will be of about 10,000 tons each. Charles R. Flint is interested in the company, and he says that companies will be formed in case the ship subsidy bill was passed.

Representative Burton, chairman of the committee on rivers and harbors, house of representatives, and Representative Foss, chairman of the committee on naval affairs, have arranged to visit Seatttle and other points on Puget sound after the adjournment of congress. Other members of these committees will probably join them in the trip. Considerable pressure is being exercised to obtain additional appropriations for rivers and harbors and for the enlargement of the Puget sound naval station.

The provision in the Pacific cable bill that the cable must be of American manufacture means much to the American Steel & Wire Co., should the measure pass. This company is the only concern in the United States which could manufacture the cable within the time specified. The first cable is estimated to cost $11,000,000, the second cable the same figure, and other connections will cost about $600,000 additional.

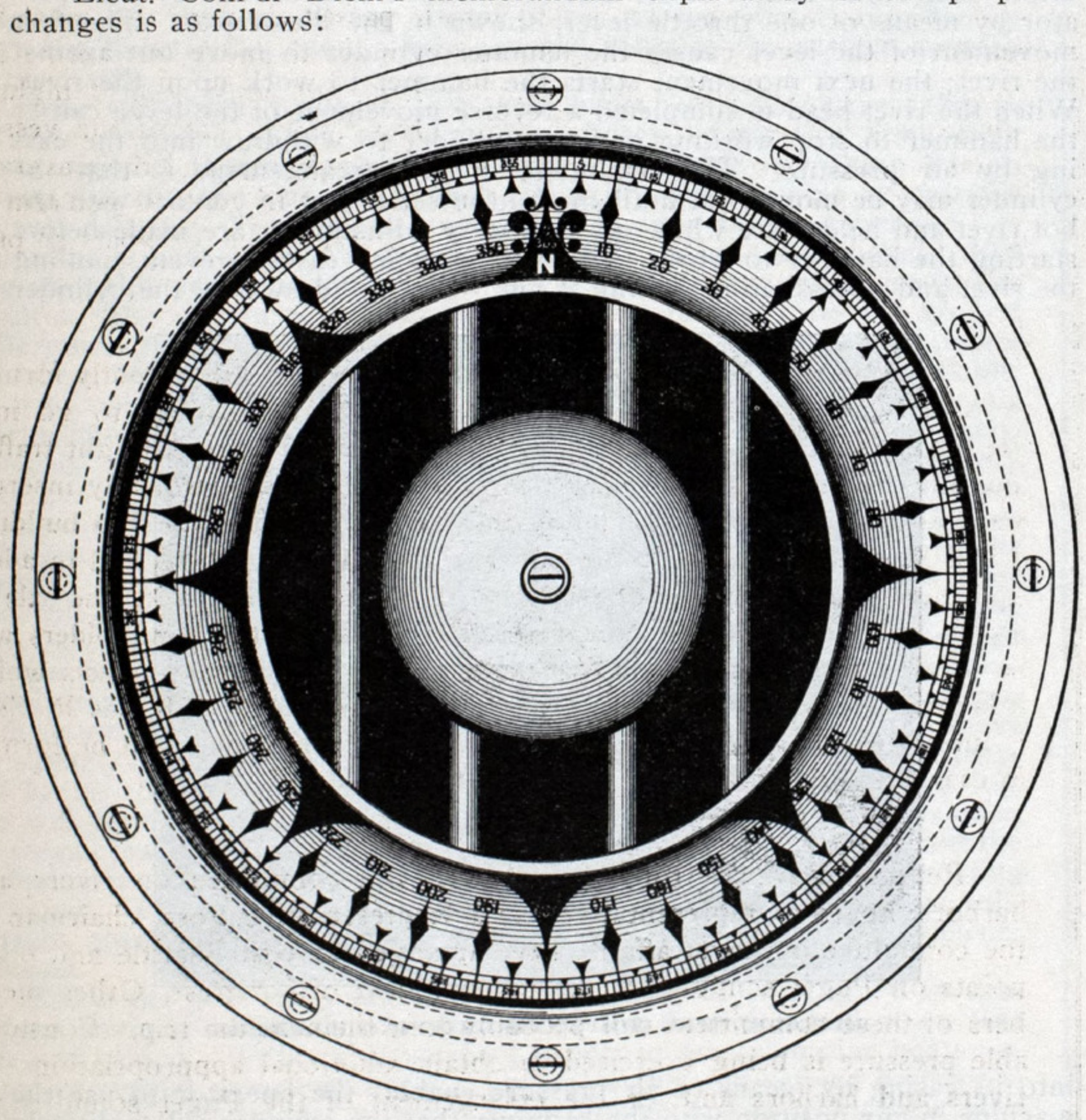
NEW DESIGN FOR COMPASS CARD.

PROPOSITION TO DO AWAY WITH COMPASS POINTS ALTOGETHER AND TO USE A CARD GRADUATED IN A CIRCLE OF DEGREES CONTINUOUSLY TO THE RIGHT.

Through the chief of the bureau of equipment, navy department, the hydrographic office proposes a design of compass card to be graduated in a circle of degrees continuously to the right from 0° to 360°, omitting the present system of points. The proposed change has been worked out by Lieut. Com'dr S. W. B. Diehl of the compass office. The chief of the bureau of equipment says of it:

"For some years this matter of doing away with the compass points and substituting degree graduations has been discussed among navigators, and the consensus of opinion, certainly among the higher order of navigators, is that the points should be abolished and only degrees used in setting courses, taking bearings, and in notices to mariners. A number of years ago a graduation of the compass rose from zero to 360 continuously by the right was proposed. Opposition arose from the naval examining board, and before the Maritime Congress then in session in Washington; the conclusion reached was that the time was not yet ripe for doing away with the old-fashioned compass points on the compass cards. There can be no question that in the last fifteen or twenty years the general standard of navigators has risen so that the present is deemed an appropriate time to take this step in advance, and while it is recognized that some opposition may be expected from the least-educated class of masters of vessels, it is believed that the greater maritime nations will recognize the advantage and adopt the same general method. The simplicity, as set forth in the memorandum from Lieut. Com'dr Diehl of the compass office, will doubtless have great weight even with the uneducated class of navigators, and once adopted it will greatly simplify many of the navigating operations of today and conduce to accuracy, which enters so largely into the handling of the larger ships that are increasing so rapidly in all parts of the world. It is therefore recommended that there be distributed at the more important mercantile centers of our own coasts and at branch hydrographic offices copies of these proposed changes, and that requests of intelligent mariners be made as to the advisability of their adoption. As Lieut. Com'dr Diehl well says, criticism should be invited. It is further recommended that these drawings, or copies thereof, be submitted to the leading hydrographers of other nations and an expression of opinion invited from them. It is believed that the necessary information to guide the bureau will have been received before the beginning of next year, so that should the final conclusion be reached to adopt it in this hydrographic office, the necessary compass cards can be distributed to ships now in service and be obtained by others desiring to use them. Already there has been obtained from the branch hydrographic offices much information which can be submitted to the bureau bearing upon this subject, and in general it may be stated, as previously, that the better navigators of today are in favor of the proposed change."

Lieut. Com'dr Diehl's memorandum explanatory of the proposed changes is as follows:



PROPOSED FORM OF COMPASS CARD.

The circumference of the card is divided into the usual 360 degrees and marked continuously to the right, from 0° at north to 90° at east, 180° at south, 270° at west, and 360° at north. The card is subdivided as follows:

(a) Into divisions of 10 degrees, accentuated by heavy lines on the graduated rim, and by suitable geometric figures on the card, each 10-degree division of the card being indicated in figures by its appropriate number from 0° or north.

(b) Each 10-degree division of the card is further subdivided into half and quarter divisions and appropriately marked.

(c) Every fifth-degree line of the graduated circle between the 10-degree divisions is marked in figures, indicating its appropriate number from 0° or north.

(d) The cardinal and intercardinal directions are emphasized on the card in geometric figures.

The object of the proposed change is to omit the present system of points and fractions thereof and use degrees only. The present card contains points and degrees. The conversion of one into the other is a natural result of the presence of both, but is not a necessity, as would speedily be recognized were the points omitted. Accuracy requires expression in degrees for courses, bearings, and compass errors, and not in points, the use of which is but a duplication of work. A comparison of a few leading features of the present system with that proposed is given below:

PRESENT CARD.	PROPOSED CARD.
360°=32 points.	360°= 36 divisions.
1 point=11.25°.	1 division=10°.
½ point= 5.625°.	½ division= 5°.
¼ point= 2.8125°.	¼ division= 2.5°.
Graduated circle is marked in degrees in each quadrant, from 0° at north and south to 90° at east and west.	Graduated circle is marked in degrees continuously to the right from 0° at north to 360° at north again.
The fifth point is NE. by E. or N. 56° ¼ E.	The fifth division is 50°, a multiple of 10°.
The thirteenth point is SE. by S. or S. 33° ¾ E.	The thirteenth division is 130°, a multiple of 10°.
The course is S. 18° E. or S. by E. ⅝ E.	The course is 162°.
Easterly deviation is additive in the NE. and SW. quadrants; subtractive in the SE. and NW. quadrants, to compass course to get magnetic.	Easterly deviation is always additive to compass course to get magnetic.
Westerly deviation is subtractive in NE. and SW. quadrants; additive in SE. and NW. quadrants, to compass course to get magnetic.	Westerly deviation is always subtractive from compass course to get magnetic.

In line with the proposed card, the compass rose on the chart should be marked from 0° at north continuously to the right to 360°, omitting the present system of points. The sailing directions should give courses and bearings in degrees and not in points. The azimuth tables would require only a change in the rules given at the bottom of the page, as follows:

When the latitude and declination are of the same or contrary name—

In north latitude the azimuth is the tabulated value when the time is a. m.

In north latitude the azimuth is 360° minus the tabulated value when the time is p. m.

In south latitude the azimuth is 180° minus the tabulated value when the time is a. m.

In south latitude the azimuth is 180° plus the tabulated value when the time is p. m.

No other change in the tables would be necessary. Such tables as that on page 8 of Bowditch, and tables 1 and 5A would be eliminated.

It is believed that the proposed marking of the compass card would result in greater accuracy in navigation in its relation to the compass. Courses would be laid in degrees and more accurately noted, as the approximate course of SW. by W. ¼ W. "a little westerly," for example, would be replaced by the exact course of 240°. Chances of error in the application of the deviation to compass courses would be lessened. Conversion of points into degrees and the reverse would be eliminated from the problem. Boxing the compass would be a matter of a few minutes' instruction to the layman of average intelligence. Sailing directions would be simplified. All work in relation to the compass would be facilitated.

ATLANTIC AND PACIFIC COAST BUILDERS.

A NUMBER OF NEW CONTRACTS ARE TO BE NOTED WITH THE ADVENT OF THE NEW CENTURY—LAUNCHES, TRIAL TRIPS, ETC.

The firm of Carlton, Norwood & Co., Rockport, Me., is to resume ship building at the old Pascal yard, Rockport, in the spring. The first vessel to be built will be a four-masted wooden craft for Capt. Simon H. Hall of Rockport.

Gardiner G. Deering will launch some time in January the four-masted wooden schooner Malcolm B. Seavey. Mr. Deering has leased the Palmer yard at Bath and will start work immediately on a five-masted schooner.

A five-masted wooden schooner to be built by the Holmes Ship Building Co., Mystic, Conn., will be the first vessel of that class built on the Atlantic coast outside of Maine. She will be launched in July.

J. B. Hannify & Co. of San Francisco have placed an order with C. Fulton of New Whatcom for two wooden schooners. They will be built at Port Hadlock.

The Bath Iron Works, Bath, Me., has recently been asked to submit figures on the cost of a seven-masted steel schooner to carry 6,000 tons of coal.

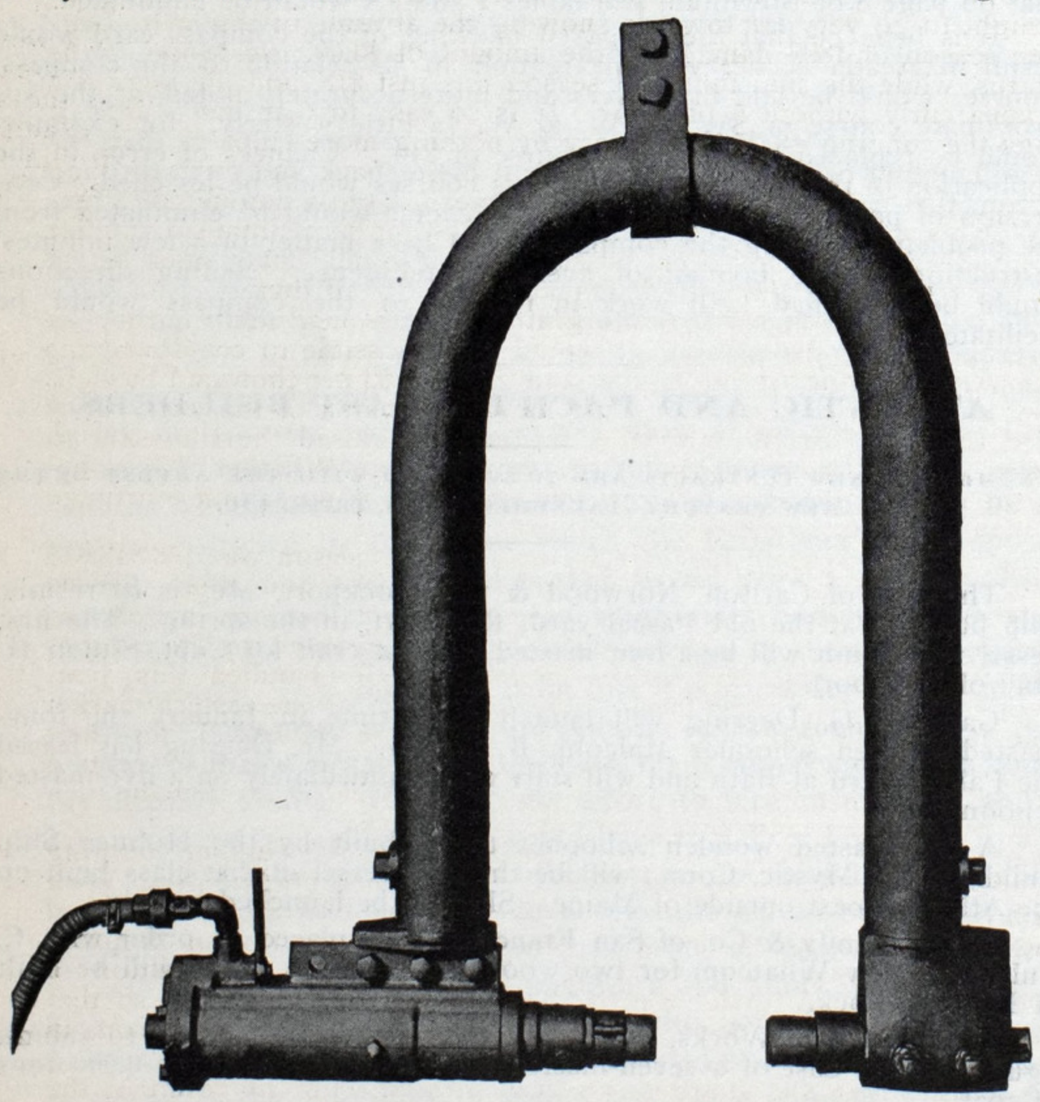
A four-masted schooner building at the New England Co.'s yards, Bath, Me., for Capt. George Kelsey of Clinton, will be launched next week.

Work on a new steam yacht for A. H. Davenport was begun last week at the Atlantic Works, East Boston.

The battleship Ohio will be launched at the Union Iron Works, San Francisco, on May 18.

PHILADELPHIA PNEUMATIC TOOL CO.'S PRODUCTS.

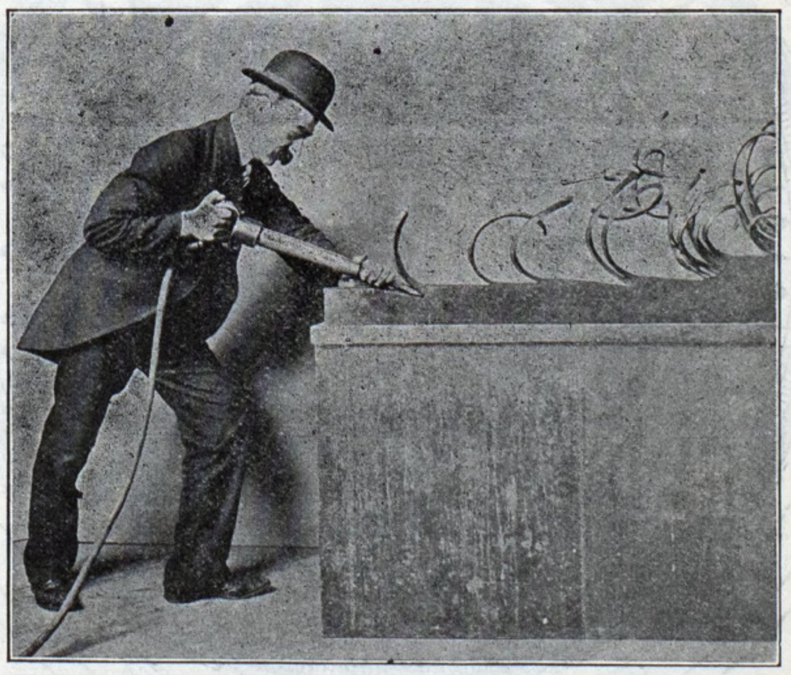
The pneumatic tools now being manufactured by the Philadelphia Pneumatic Tool Co. of Philadelphia have many important and novel features. The company's chipping and calking hammers are made in five sizes, the smallest being designed for light chipping and calking and the largest for the heaviest kind of work, such as chipping steel castings, cutting off gates and sink heads. These hammers are of the valve type and it is due to the design and construction of the valve that the hammers are so popular. There are only two moving parts in the hammer, the hammer proper and the valve, both moving in the same direction at the same time, so that the jar caused by the hammer striking a blow tends to more firmly seat the valve and not to move it from its seat. For riveting two



PHILADELPHIA COMPANY'S IMPROVED YOKE RIVETER.

sizes of hammers are made, the smallest one driving 5/8-in. hot rivets and under, and the largest, or long stroke hammer, driving 1⅛-in. hot rivets. The design and construction of the valves of these hammers is the same as in the chipping hammers. The long stroke hammer, by an ingenious arrangement, ceases to operate as soon as the die is lifted from the rivet, although the throttle valve may be open; this avoids any unnecessary wear or liability to breakage which may occur should the hammer operate when the die is not held against some object.

The pneumatic riveting machine illustrated in this article is adapted to a wide range of work on tanks, stacks, bridges, ship framing, structural work and the like. It will drive rivets of any size up to 1⅛ in. and may be used with any depth of yoke from 10 in. to 10 ft. or more. The riveter itself presents many improvements in design. It is absolutely positive in its action, no dependence being placed on springs or other similar devices. The entire action of the machine is under the control of the operator by means of one throttle lever, shown in the illustration. The first movement of the lever causes the hammer cylinder to move out against the rivet; the next movement starts the hammer to work upon the rivet. When the rivet head is completed a reverse movement of the lever causes the hammer to stop working and the cylinder to withdraw into the casing by air pressure. The advantage of this arrangement is that the cylinder may be moved out until the button set comes in contact with the hot rivet and held there while any necessary adjustments are made before starting the hammer to work. This will, in many cases, prevent spoiling the rivet and necessitating cutting it out. The withdrawal of the cylinder



PHILADELPHIA COMPANY'S CHIPPING HAMMER.

into its casing by means of air pressure enables the operator to use the machine in any position with the certainty that the cylinder will positively remain inside the casing until he is ready to drive the next rivet. The machine is light in weight, and simple in construction, having but three moving parts. It is fully guaranteed as to efficiency and durability. With each machine the company furnishes two riveter dies and one holder on die with necessary collars for adjusting the gap for different lengths of rivets. The machine requires 25 cu. ft. of free air per minute for its operation, and ample facilities are provided for thoroughly oiling all parts. On field work, erecting large water, gas and oil tanks eight to 100 rivets per hour have been driven.

The illustration showing chipping operations with the No. 3 hammer

is very interesting. This chipping was done at the rate of 1 ft. per minute, using air at 80 lbs. pressure per square inch. The work was done on 3/8-in. boiler plate of unusual toughness. It would be impossible for a man with an ordinary hammer and cold chisel to take off chips of such thickness.

The third illustration shows men at work with Nos. 1, 2, 3 and 4 chipping hammers.

FUTURE OF THE SUBMARINE BOAT.

AN INTERESTING PICTURE OF THE POSSIBILITIES OF THE UNDER-WATER CRAFT, BOTH IN WARFARE AND FOR COMMERCIAL PURPOSES, IN SUCH SHORT RUNS AS THE ENGLISH CHANNEL SERVICE.

John P. Holland in the North American Review.

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When the first submarine torpedo boat goes into action, she will bring us face to face with the most puzzling problem ever met in warfare. She will present the unique spectacle, when used in attack, of a weapon against which there is no defense. You can pit sword against sword, rifle against rifle, cannon against cannon, iron-clad against iron-clad. You can send torpedo boat destroyers against torpedo boats and destroyers against destroyers. But you can send nothing against the submarine boat, not even itself. You cannot fight submarines with submarines. The fanciful descriptions of the submarine battle of the future have one fatal defect. You cannot see under water. Hence, you cannot fight under water. Hence, you cannot defend yourself against an attack under water, except by running away. If you cannot run away, you are doomed. Wharves, shipping at anchor, the buildings in seaport towns cannot run away. Therefore, the sending of a submarine against them means their inevitable destruction.

Tomorrow, if we had a fleet of submarines big enough, they could protect New York harbor completely against an attack by the combined surface fleets of the world. But our shipping and our city would still be at the mercy of our enemies, if they had even one submarine, manned by a fearless crew of experts. You could not mine against her, for she would countermine. You could not close the harbor against her, even with a net-work of torpedoes and chains stretched across the Narrows, reaching from the surface to the bottom of the channel. From a safe distance she would simply send a torpedo against the net-work that would blow it to pieces, giving her all the passageway she wanted to go in and out. You could not chase her with a fleet of your own submarines, because you could more easily find a needle in a hay-stack than a 65-ft. cylinder in a place like New York bay. And if, by accident, you did find her, she would be out of sight in a flash. Then, too, the pursuing boats could never tell under water whether it was one of their own number or of the enemy. This difficulty might be met by sending only one submarine in pursuit; but, in that case, the prospect of finding the quarry would be about as promising as dredging with a butterfly-net for a half-dollar that had been thrown into the bay. No; as nearly as the human mind can discern now, the submarine is indeed a "sea-devil," against which no means that we possess at present can prevail. She can pass by anything above or beneath the waves, destroy wharves and shipping and warships at anchor, throw shells into the city and then make her way out again to sea. She can lie for days at the bottom of the harbor, leaving only when she has used up all her stored power except what is required to carry her back to the open, where she can come to the surface a speck on the water.

Some still insist, however, that these boats will never have value as offensive weapons. They say that these boats cannot live away from home, and that, therefore, they will never be available in making war on a country across the seas. They rank submarine boats simply as weapons of coast defense. That this is erroneous will soon be demonstrated. A submarine is now under construction that will explode this theory. Not long after this article is published, she will start on a journey across the Atlantic. She will travel entirely under her own power. She will go first to Bermuda, a distance of 676 miles, then to Fayal, 1,880 miles, and thence to Lisbon, 940 miles, or a total of 3,496 miles. If it were deemed advisable, the trip could just as easily be made direct, without making a call at any intermediate port. This boat will go on the surface almost exclusively. Her chief motive power will be a gasoline engine of 160 H.P., that will drive her at the rate of nine and a half knots an hour. The engine will also generate the electric power that may be needed for submerged runs, and such work as may be deemed expedient in the harbors where she touches. Her crew will subsist entirely on the provisions she carries. The food will be cooked by electricity. The crew will consist of seven men, who will sleep in hammocks slung from the ceiling. While this voyage will not be comfortable, judged from the standpoint of the regular trans-atlantic travelers, it will not entail any real hardships. During storms or dirty weather the boat will run awash, only her turret showing above the surface, and as the water will break over instead of against her, there will be no rolling. The boat will lie as steadily as a water-soaked log. She will be accompanied by a tender, probably a small tramp steamer. An extra crew will be carried on this tender, in case her own men find the confinement too much to endure for the sixteen days required in crossing the ocean. This trip will show that it is possible to send a fleet of submarines against a foreign coast, as well as to employ them for defense at home.

Within the next ten years we shall have made more progress in submerged navigation than has been made in the three hundred years that have just passed. Within that period I expect to see submarine boats engaged in regular passenger traffic. Owing to the well-defined limitations that surround travel under water, it is no difficult matter to forecast what the nature of such travel will be. For transatlantic travel submarine boats will never be possible commercially. Here and there, no doubt, such boats will cross, but the regular ocean carrying trade will always be conducted on the surface. For short trips, however, the submarine offers commercial advantages that will render it a dangerous rival of the surface-sailing vessel, if indeed it does not drive the latter entirely out of the competition in particular waters. Take, for example, the trip across the English channel. No other water journey causes an equal amount of suffering. The most hardened traveler becomes seasick there. The fogs and heavy traffic are constantly causing collisions on that course, and the storms toss the stoutest boats about like cockleshells. Thousands are deterred every year by its dangers and annoyances from essaying that short voyage. The submarine will effectually remove all these objections. There will be no seasickness, because in a submerged boat there is absolutely no perceptible motion. There will be no smells to create nausea, for the boats will be propelled by electric power taken from storage batteries, which will be charged at either end. The offensive odor that causes so much discomfort in surface boats is due to the heated oil on the bearings, and to the escaping steam. There will be no steam on these submerged channel boats, and the little machinery necessary to drive them will be confined within an air-tight chamber. There will be no collisions, because the boats coming and the boats going will travel at different depths—say, one at 20 and the other at 40 ft. The water overhead may be crowded with large and small craft, but the submarine will have a free, unobstructed course. She will be kept absolutely true to this course by means of cables running from shore to shore. On these cables will run an automatic steering gear attached to the submarine. Storms and fogs will have no existence for the traveler, for weather cannot penetrate below the surface of the water. There, everything is smooth and clear.

The appointments on such a vessel will be finer than anything that can be furnished on the surface. There will be no dampness, no stickiness. The passenger will enter a handsomely fitted cabin at Dover. Electric lights will make it cosey and bright. Neither the cold of winter nor the extreme heat of summer will be felt. The temperature under water is about the same all the year round. Almost without a jar, the boat will put off from her dock on the English side. Practically no vibration will be felt from the smoothly running machinery. Before the traveler fairly realizes that a start has been made, the boat will be fast at her dock at Calais. The three or four hours consumed will be passed in reading, in sleep or in social intercourse, as pleasantly as though the traveler were at home in his own drawing-room. The nervous old lady will have less to worry her than she would find on a drive through the streets of London or Paris. Her husband or son will find perfect comfort in a handsomely appointed smoking-room. This is no dream. It is simply the forecast of a trip that I myself expect to make some day, and I am fifty-nine years old. It is so feasible commercially that capital in plenty will be found for its realization.

BUFFALO GRAIN SHOVELING QUESTION.

Buffalo, Jan. 9.—Now that the annual meeting of the Lake Carriers' Association is in sight and the question of handling the grain from vessels at Buffalo is again an important problem to be solved by it, there ought to be especial interest in looking over the season's work and noting what has been accomplished, for if it has not been an improvement on the contract system this is an argument in favor of returning to contract work.

It seems to be the universal opinion that Supt. Kennedy has succeeded remarkably with the direct handling system. I find that even some vessel men, said not to be anxious to praise the system, are saying that the grain was handled more satisfactorily during 1900 than in any previous season. I must disclaim any end in view or any ax to grind in the matter. It is merely in the interest of good business that mention is made of it here. I had occasion sometime ago to declare that the shoveling has gone on so smoothly that scarcely anybody would have supposed that there was such a problem in existence. Our costly experiences of the previous season are all fairly forgotten.

Of course, this could not have been possible unless the shovelers as well as the elevator, vessel and grain owners were anxious to avoid collisions and work to the best purpose. Here is an item in this connection that ought to go very far towards showing the attitude of the men: During the season of 1899 damage to the amount of $3,000 was done to the apparatus, while the sum total last season was just $18, and the men paid that, apparently without a murmur. It is so easy to tear out a pipe or derange the running of the machinery by nothing more culpable than the careless handling of the steam shovel, as it hisses back and forth through the grain, that a breakage so small must mean a great amount of attention to business. It may be that this rate could not be maintained another season, indeed, it does not seem possible that it could, but it must be set down to the credit of the present management, for all that.

There are more than 900 active grain shovelers in Buffalo harbor on the average during the season. It would be impossible to cut down this number without injuring the service; and the pay, $2 per thousand bushels, is none too much for men who must lie idle so much of the year. It is claimed that now for the first time the pay has raised the shovelers to the level of other workingmen of the same grade. Whether this is because the pay all goes direct to the men and there is no saloon mortgage on it may be left to someone else to settle.

The amount of grain handled during the past season was 156,813,613 bushels. This includes 6,800,000 bushels of flaxseed and about 100,000 bushels counted twice by reason of lighterage, but does not include the cargoes from the season of 1899 handled by Supt. Kennedy or the cargoes of the Penobscot and Kearsarge—294,698 bushels—handled this year. There is still about 1,650,000 bushels afloat, waiting for the eastern market to take it. So the 900 men were paid a matter of $313,627.23 for their work, a manifestly large sum, though if the grain was worth 50 cents a bushel on the average it bore a valuation of $78,406,306.50, so that the men did not very sensibly reduce its value by their work.

There were twenty-two elevators active during the season, counting the city as two and the Niagara three. These constitute the New York Central houses. Two large ones, the Eastern and Dakota, were burned during the summer and both are in course of reconstruction as fireproof structures and considerably enlarged. There has been an addition of 800,000 bushels added to the Electric elevator during the season, so that the harbor capacity has been considerably increased for next season, in spite of the fires.

It appears that the shovelers are well pleased with the result of the season's experiment and will take it up again without a question next season, if desired. What do the vessel owners say about it?

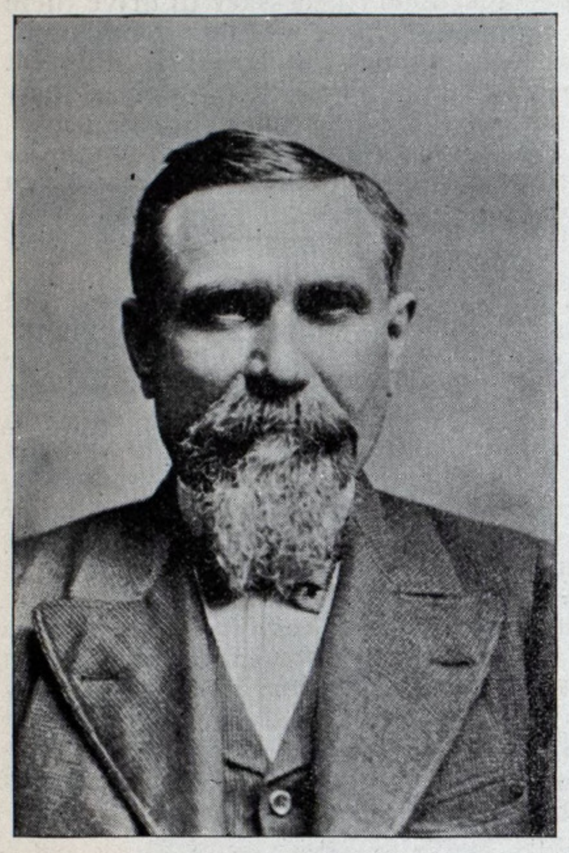
JOHN CHAMBERLIN.

The largest steamship to pass through the Suez canal up to the present time is the Grosser Kurfurst of the North German Lloyd's Australian service. The vessel is of 13,182 tons.

PROBLEMS OF THE FUTURE.

By Louis Gathman, inventor of the Gathman gun.

What the most important invention of the new century will be cannot even be guessed at. But we certainly can predict the improvements and perfections of existing inventions. Perhaps of greatest interest will be a powerful telescope, which will enable us to learn more about our neighbor planets and their probable inhabitants, and perhaps permit of interplanetory communications by signs and signals. I am convinced that such a telescope is possible, but it could not be built for less than $100,000 if a power of ten times that of our present most powerful telescope is necessary. In the course of the century man will no doubt begin to understand how to live in harmony with nature's laws. Instead of being near the end of life at seventy or eighty, man will then be in his prime. Of very great importance will be the production of power. This, indeed, becomes a very serious question on account of the limitation of fuel. In the future, power must be obtained from natural forces constantly in operation, and not from materials of nature; the materials (a true product of the sun) being stored up in millions of years, are but a limited amount in comparison with the rapidly increasing consumption. This question, I am convinced, will be satisfactorily solved by perfecting solar motors. Man will doubtless better understand nature's laws, and what use to make of them—for instance, withdrawing from the air, by artificial means, the watery vapor held in suspension there. In other words, making rain at will. Further, agriculture will advance and become a science. Electricity will play an important part in obtaining a maximum result from a minimum amount of space.



Of more or less importance will be the perfection of implements of war. Our present battleships and costly cruisers will have to go. It will be impossible to protect their vitals by armor. Not even the protective deck, below the water line, will save them from sinking when the 18-in. aerial torpedo gun now at Sandy Hook, opens fire on them. Congress is now considering an appropriation to put this gun into action. Of somewhat greater interest will be the perfection of an air ship or rather aerial locomotive. This is already within the reach of mechanical engineers. Its completion and success, like that of many other great inventions, requires the aid of capital. But it seems to be the common fate of all great inventions and discoveries to raise a storm of opposition, and strangely, from those whom they are most calculated to benefit. We find, through all ages, as a rule, that no men have been more afraid of real progress than those who have gained great wealth or high positions by birth, money, age, political or other influences, which so often bring men into positions which are and have been detrimental to progress and the welfare of the human race. Therefore low culture still predominates.

OPPOSED TO THE SHIPPING BILL.

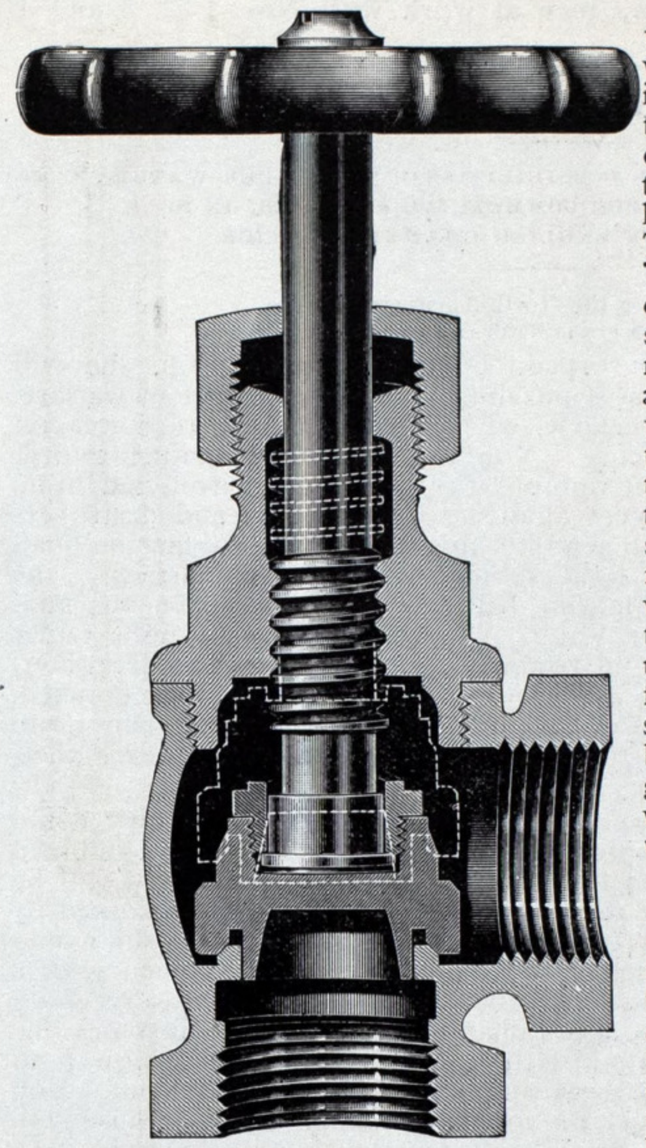
The Merchants' Association of New York has issued a pamphlet containing some of the recent correspondence which the association had with Senator Frye about the ship subsidy bill, now pending in congress. The board of directors of the association has declared that the bill is "counter to public sentiment, and in conflict with the public good in admitting foreign tonnage to American registry and half subsidy." In a letter to Senator Frye the association declares:

"We do not contend that the present ocean rates cannot be reduced, but, on the contrary, we believe that a reduction will follow upon a return to commerce of the tonnage diverted therefrom in the last two years. We do contend, however, that a reduction in ocean rates is not to be brought about by curtailing competition and that competition is curtailed once advantages are given to a few selected American owners of foreign tonnage not within the reach of all Americans. We believe that in the course of time the products of American ship yards, encouraged by a subsidy to American tonnage only will develop a fleet adequate to care for American commerce, and we very much desire such a consummation. It will not be reached, however, by a reduction of the subsidy that would accrue to such American tonnage through a deviation of several millions of dollars per annum as an extra bonus to the owners of foreign tonnage to bring it under the American flag. In conclusion we wish to assure you that no association will go further to assist in the education of public sentiment in favor of a legitimate subsidy measure than we will. We do not believe, however, that a subsidy bill is so necessary as to warrant the granting of power to a few to oppress commerce, and we do not believe that any legislation is so important or urgent as to sustain the charge of class legislation, and all the adverse sentiment which that will evoke."

President C. B. Orcutt of the Newport News Ship Building & Dry Dock Co., in an interview on the outlook for American ship building published in the Manufacturers' Record, refers to the opportunities in the south for the establishment of ship yards and states that American vessels are built of better material and show better workmanship than the average European ship. Mr. Orcutt strongly favors the subsidy bill pending in congress, on the ground that it will stimulate not only the shipping interest, but every department of American industry without an exception. He states that the Newport News company intends making a specialty of large contracts in future and that the new dry dock will give facilities for repairing large ships, which in the past have had to be docked in foreign yards.

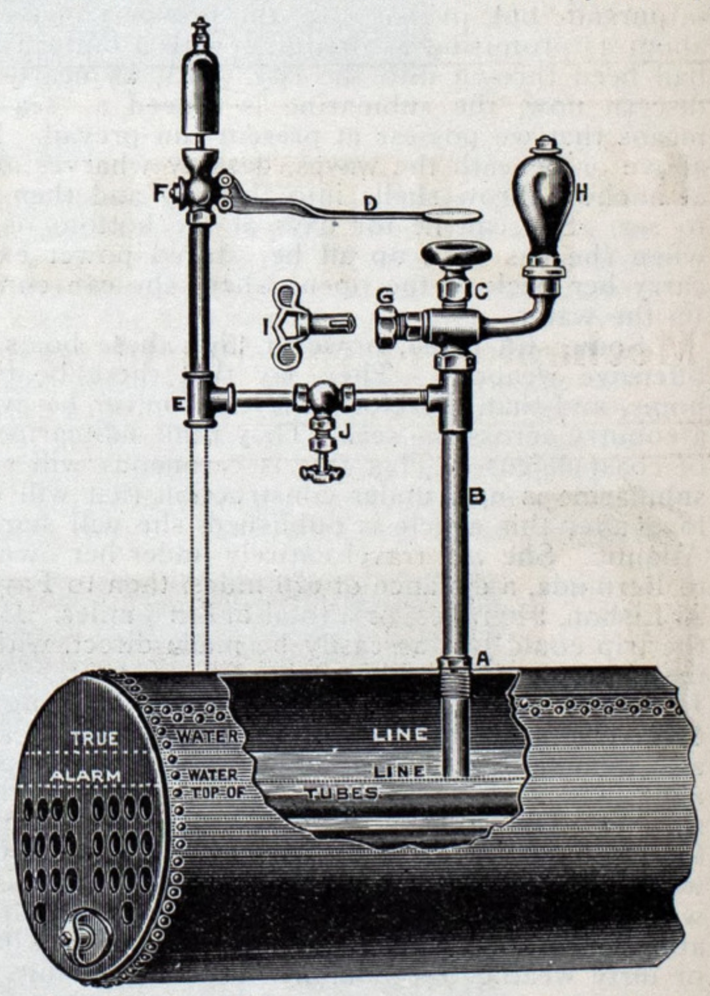
NEW SPECIALTIES OF THE CRANE CO.

The blow-off valve illustrated herewith is manufactured by the Crane Co. of Chicago and was designed to overcome the trouble generally experienced with the ordinary valves and cocks used for this purpose.



It will be observed that the valve seat is on the outside, which prevents sediment lodging at this point. The projection on the under part of the disc prevents any discharge taking place until the seats have become widely separated. This prevents wire drawing. This valve should always be connected from the pressure side. The company recommends them to all steam users as the most reliable blow-off valves on the market for this trying position. They report that their customers say that the valves are giving entire satisfaction and are far superior to the ordinary blow-off valves which they have used in the past. They have been in use on the Crane Co.'s boilers for three years and they are still in perfect order. They can be made in either angle or globe patterns; angle will always be furnished unless otherwise ordered.

The second illustration shows the Crane patent low water alarm. The low water alarm as originally made by the Crane Co. some ten years ago, was considered sufficient to meet all requirements. A comparatively short time ago some of the states enacted a law, stipulating that low water alarms "should be of a type capable of being tested by the inspector of workshops and factories." It was, therefore, necessary that an additional valve, with pipe and fittings, be used, thereby enabling the inspector to make a test at any time. The Crane alarm can be attached directly on top of the boiler, or can be piped to any position most convenient to the engineer. The company furnishes fusible gaskets with these low water alarms that melt at 270°. Gaskets that will melt at a much higher degree are made to order. The directions, which follow, are interesting:



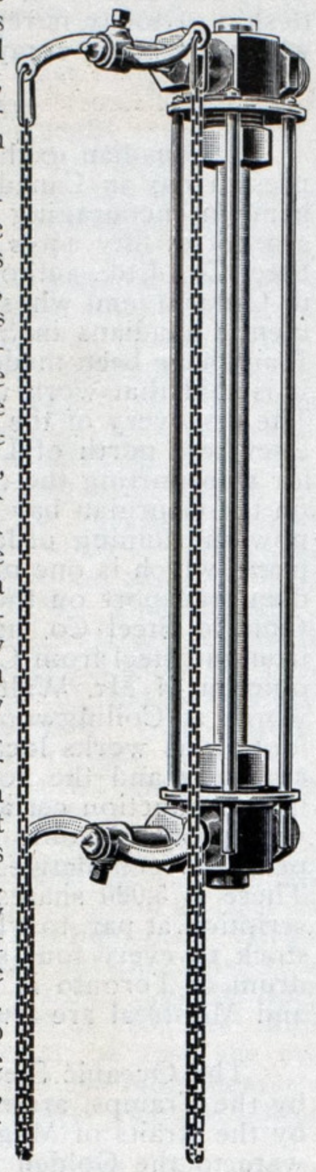
Drill and tap hole in top of boiler of the same size as bushing "A." Screw short piece of pipe inside of bushing, the pipe to be long enough to reach within 2 in. of top of boiler tubes. Connect tee "E" by a pipe to any suitable place in the boiler producing live steam. As long as the water does not go below the low water line, the water in tube "B" prevents the steam from reaching the fusible plug. The moment the water falls below the low water line, the steam will rush in and fuse the plug "C," thereby allowing the steam to escape through the hole in the wheel, which raises lever "D," opening valve in whistle "F," thereby allowing steam in pipe "E" to give the alarm. To renew fusible plug, close valve "G," unscrew nut "C," and insert new gasket. Then replace nut "C," allowing pipe "B" to cool before opening valve "G." Then remove the key "I," which indicates that valve "G" is open and ready for operation again. By following this rule there can be no mistake, as the key cannot be withdrawn unless valve is open. The valve "J" should be open only when testing. When testing, open valve "J," allowing live steam to pass into pipe "B," which will melt the gasket. This should be done once a month to keep pipe "B" clean.

An item of importance to lumber men of the Pacific coast came last week in a telegram from Washington to the effect that the secretary of the navy had ordered an investigation of the merits and quality of Douglas fir with a view of having it used for sheathing battleships built on the Pacific coast. As there has never been any government tests of fir, yellow pine has invariably been specified for government work.

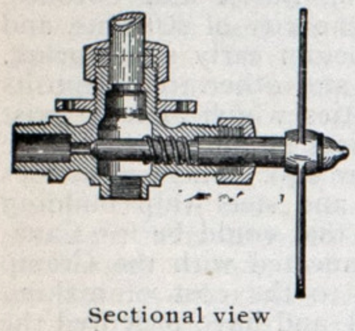
The board on naval construction has decided to recommend to congress the construction of a 3,000-ton training ship for the naval academy, in accordance with the plans of Supt. Wainwright. It was concluded that the Chesapeake is too small for the accommodation of the cadets.

QUICK CLOSING WATER GAUGE.

Water gauge glasses have the faculty of breaking at any and all sorts of inopportune moments, and many an engineer has nursed scalds and burns received while trying to close the cocks. Even the protection of a fire shovel, hastily picked up and improvised as a shield, does not lessen the danger of burns or scalds from the escaping water and steam. It is claimed for the P. B. H. water gauge, illustrated herewith, that it effectually prevents any such harm, and it accomplishes the closing of the valves in a hundredth of the time.



As will be seen from the accompanying illustrations, the gauge itself does not differ from those ordinarily in use on boilers. But instead of valves at the upper and lower ends, there are two cocks, each consisting of a single stem, threaded near its middle and connected outside to a double crank. The opposite end forms the valve, fitting into the gauge connection when closed, and thus preventing the escape of steam or water. The thread on the valve stem, it will be seen, is of a high pitch, so that it requires only a comparatively slight rotation of the stem to close the cock. This rotation is accomplished by means of a chain attached to the crank on the stem, the chain hanging at such a distance from the floor as to be within easy reach of the fireman. When a glass breaks, all that is necessary is to pull the right hand chain, and both connections to the gauge glass are closed, and the glass may be quickly replaced. The tubes used in the P. B. H. glasses are carefully selected. The body and connections are of the best steam metal, and they are provided with extra large nuts to allow the use of extra large rubber washers. Each gauge is supplied with enough brass chain to allow it to be operated 10 ft. from the floor. The manufacturer is Paul B. Huyette, 1226 Betz building, Philadelphia, of whom price-list and further information can be had upon application.



Sectional view

The Nickel Plate road will send its 1901 Pan-American exposition calendar to anyone sending their address to the general passenger agent at Cleveland, O. 2, Jan. 31.

TRADE NOTES.

The Joseph Dixon Crucible Co., Jersey City, has issued an attractive little volume upon the subject "Where the New Century Will Really Begin." It is devoted to a description of the places which saw the new century first. Incidentally it has a great deal to say of Dixon's pencils.

A most excellent calendar has been issued by David Kahnweiler's Sons, 437 Pearl street, New York, manufacturers of cork life preservers, metallic life boats and rafts. The calendar bears a reproduction of the famous painting, "The Departure," representing a life boat going to the rescue of a stricken schooner.

Wilson & Silsby, Rowe's wharf, Boston, sail makers, have issued an attractive calendar, in which are recorded the New York and Boston tides. The calendar is illustrated with reproductions of the yachts Constellation and Hildegarde. It also contains the following announcement: "We make the sails for the Lawson Boston cup defender."

Under the title "Pneumatic Tools—Hammers, Riveters and Drills," the Cleveland Pneumatic Tool Co. issues in a purple cover an attractive catalogue of its output. The company opens the catalogue with a modest introduction, in which it says that it has no testimonials to cover but that its tools are made of the best materials and are simple and durable.

It is announced from Chicago that the business of the Q. & C. Co. and the Railroad Supply Co. will hereafter be operated as one company, under the name of The Railroad Supply Co., with D. S. Wegg as chairman of the board, and C. F. Quincy as president. Headquarters in Chicago will be in the Bedford building, and in New York at 106 Liberty street.

Under the title "Two Magicians—Oriental and Occidental"—the Chicago Pneumatic Tool Co. has issued an attractive calendar for January. The first picture shows one of the fabled temples of Aladdin, built by his lamp; the second shows far more ingenious structures, such as a steel bridge, modern sky scraper and the Deutschland, built by the aid of pneumatic tools.

The American Steel & Wire Co. has issued a handy pocket pamphlet devoted to wires and cables for telephone, telegraph and light power circuits. It is not a catalogue but is merely a convenient volume regarding the electrical department of the company. As a guide to the output of electrical conductors made by the company it is an exceedingly handy work of reference.

No advance was made in prices of plates at the meeting of steel manufacturers held in New York a few days ago. Prices were reaffirmed and all present felt satisfied that conditions were such that a good year's business would be done. Owing to the fact that many of the western mills were well filled up on plate orders, some of the representatives at this meeting favored a slight advance, but the majority believed that it would be the wisest policy to let prices remain as they were for the present at least.

"LITTLE GIANT" Pneumatic Tools

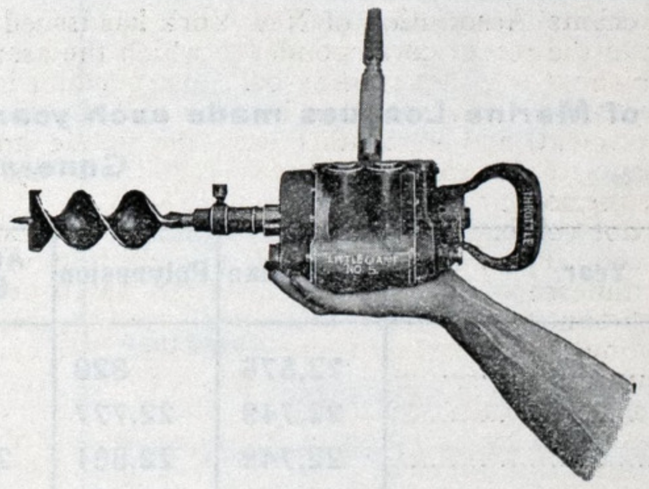
Recognized by the Mechanics of the World to be the Most Efficient and Practical AIR Tools Manufactured.

New "Little Giant" Long Stroke Hammer.

"The Best Yet." Will Drive Perfectly One Inch Rivets. No Vibration. Guaranteed Against Repair for One Year. Our Hammers are unexcelled for all classes of Riveting, Chipping, Calking, Beading, Etc. MADE IN ALL SIZES.

SENT ON TRIAL.

Send for our latest Catalog "E." It will interest you.
We make AIR DRILLS of all kinds.



The "Little Giant" Reversibie Boring Machine No. 5

Especially Designed for Shipyard and Dock Work. Will Bore up to 4″ in Diameter in any kind of wood. Piston type. Weight, 14 lbs. Very Powerful. Will perform the work of five men. In use in all the U. S. Navy Yards and Large Shipyards.

STANDARD PNEUMATIC TOOL COMPANY,

MANUFACTURERS OF PNEUMATIC TOOLS AND APPLIANCES OF EVERY DESCRIPTION.

General Offices—Marquette Bldg., CHICAGO. Eastern Offices—141 Broadway, NEW YORK.

Branch Offices in all the Principal Cities of the World.

FROM WOODEN FRIGATE TO IRON BATTLESHIP.

Rear Admiral Philip Hichborn in New York World.

Naval architecture in this country has undergone an almost incredible transformation during the century just passed. The evolution, whose consummation may be seen in the magnificent warships just sent out, has been marked by seven distinct stages, familiar to the student of this branch of our country's history. Compare, for instance, the historic fleet of Columbus, the Santa Maria, Nina and Pinta, the first boats that floated our waters, with the modern ship. Great ships in their day, they would now seem the merest cockleshells. Indeed, the Santa Maria, largest of these famous vessels, was but 63 ft. long and of but 200 tons burden. Two centuries later on our first naval vessel was built. This proud achievement was called the Folkland. She wasn't really an American ship, however, for the colonists no sooner saw her finished—she was built at Portsmouth—than they presented her to the English government, which immediately added her to its navy. The Folkland was of 637 tons burden and carried thirty-four guns and a crew of 226 men. Our historic Constitution marks the next stage of development, and represents the type of naval architecture that prevailed at the opening of the nineteenth century. No American needs to be told the story of this ship, built in 1797 and still in existence, which is perhaps the cornerstone of our national glory. The Constitution was a fine frigate in her time, 175 ft. long, with 2,200 tons displacement.

During the entire first half of the century the Constitution type of vessel was not improved upon. In 1850 steam was introduced, and at this date there was built in Philadelphia the Powhatan, a side-wheel vessel of 3,980 tons displacement, carrying seventeen guns. At the same time there was built the Minnesota, one of the best war vessels in the world at that time. To this class belonged the Roanoke and Merrimac, both cut down and converted into ironclads at the beginning of the civil war by the federal and confederate authorities, respectively; the Franklin, in which Admiral Farragut made his tour of European ports after the close of the war; the Colorado and the Wabash. All were good ships and performed splendid service. The Monitor was built by John Ericsson in 1861, and though, individually, she was the first crude development of an idea, she revolutionized the navies of the world. Her splendid service showed that spars and sails must no longer be considered a part of a war vessel's means of propulsion, and that ships must be protected by armor to meet the improvements in ordnance. While the Monitor type has long since passed out of favor as a sea fighter, there are certain phases of national defense for which many authorities consider its latest development, the Arkansas, Connecticut, Florida and Wyoming, now building, the best vessels that can be devised. In them the only radical departure from the original consists in providing living accommodations above water. Other differences are those of detail. The Katahdin and Holland were the best examples of the next stage. The former is the outcome of the confederate ram Tennessee. Admiral Ammen, who participated in the fight between that vessel and the federal ships, always thereafter held the fixed belief that the ram was the most formidable weapon of marine warfare, and finally persuaded congress to authorize the construction of a vessel after his designs, and the Katahdin was commenced at the Bath Iron Works in July, 1891. Owing to the difficulty of procuring her armor, she was not completed until February, 1896. She is 251 ft. long, 43 ft. 5 in. wide, 21 ft. deep, and at a 15 ft. draught displaces 2,155 tons. The most perfect battleship of today is represented by the Virginia and class, the designs for which are being completed by the bureau of construction and repair.

CRAMP ONTARIO STEEL CO.

A Canadian exchange says: "Among the industrial activities of the present day in Canada iron takes a prominent place. Not to be behind hand in encouraging smelting works the town of Collingwood has made a grant of fifty acres of land and some water lots to the Cramp Ontario Steel Co., Ltd., authorized capital $5,000,000, which has been incorporated in Ontario, and whose directors are capitalists in Philadelphia and prominent Canadians in Sault Ste. Marie, Collingwood, Barrie and Toronto. Plans have been made for a blast furnace with a capacity of 200 tons, and it is said that work upon the buildings will be begun early next spring. The discovery of the Michipicoten iron deposits and other iron deposits elsewhere north of Lake Superior, and the facilities which already exist for transporting the ore, have made such enterprises far more practicable on the Georgian bay than they were even one year ago. There is besides now in running order in Collingwood an iron and steel ship building plant, which is one of the most important things that could be for Canadian transport on the lakes. The gentlemen connected with the Cramp Ontario Steel Co. have informed themselves as to the cost of making iron and steel from Canadian ores at Collingwood, and have procured the opinion of Mr. Walter Kennedy of Pittsburg as an authority that 'the works at Collingwood would be for foreign trade on at least as good a footing as works located at Pittsburg.' The concession received by this company and the bounties paid by Ontario and the Dominion for pig iron production certainly lead to the belief that the industry should be a very profitable one. Of the 50,000 shares of $100 each 20,000 will be 7 per cent. cumulative preference stock and 30,000 shares common stock. There is 5,000 shares of preference stock offered to the public for subscription at par, to which will be added, as a bonus, one share of common stock to every four shares of preference stock allotted. Mr. J. A. Meldrum of Toronto is the broker, and the National Trust Co. of Toronto and Montreal are trustees for the shares."

The Oceanic Steamship Co.'s new steamer Sonoma, 6,000 tons, built by the Cramps, arrived at San Francisco last week, breaking all records by the straits of Magellan, making the trip from the mouth of the Delaware to the Golden gate in 38 days 9 hours, without making a port of call.

A London dispatch announces that Donald Currie & Co., the well known ship owners, will build seven large steamers to trade between Great Britain and South Africa and America and South America.

BELLEVILLE GENERATORS

Grand Prix 1889
Originated 1849

Hors Concours 1900
Latest Improvements 1896

Number of Marine Leagues made each year by Steamships of the Messageries Maritimes Co., Provided with Belleville Generators—Since their Adoption in the Service.

Year.	Australian	Polynesien	Armand Behic	Ville de la Ciotat	Ernest Simons	Chili	Cordillere	Laos	Indus	Tonkin	Annam
1890	22,576	820									
1891	22,749	22,777	68								
1892	22,749	22,801	23,274	7,753							
1893	22,793	22,781	22,762	22,749							
1894	22,813	22,789	22,858	22,813	12,567						
1895	22,891	22,922	22,913	22,936	13,629	9,571					
1896	23,178	30,906	23,232	23,183	20,735	21.051	13,572				
1897	22,750	23,202	30,912	23.185	20,745	25,370	21.119	14,382			
1898	23,646	23,178	23,184	23.199	20,842	21,080	21,080	20,851	21,318	7,569	
1899	23,178	23,205	22,477	30,135	20,082	20,926	20,956	17,448	18,285	14,669	7,628
Total	229,323	215,381	191,680	175,953	108,600	97,998	76,727	52,681	39,603	22,238	7,628

ATELIERS ET CHANTIERS DE L'ERMITAGE, À ST. DENIS (SEINE), FRANCE.
WORKS AND YARDS OF L'ERMITAGE, ST. DENIS (SEINE), FRANCE.

TELEGRAPHIC ADDRESS: BELLEVILLE, SAINT DENIS, SUR SEINE.

DOMINION IRON AND STEEL CO.

General Manager Moxham of the Dominion Iron & Steel Co., Sydney, N. S., has been interviewed recently concerning the possibilities of his company. Some interesting statements appear in the published account from which we take the following:

Of the four furnaces under erection the first is to be ready this month and the last one will be completed in the spring. The manufacture of steel will be begun by July 1, 1901. The four blast furnaces will, it is estimated, turn out from 1,200 to 1,400 tons daily, or from 350 to 400 tons each daily, working on Belle Island ore. This unusually large product is possible, because the Belle Island ore works kindly in the furnace. Practically the whole of the metal output will be manufactured into steel when finished. Two of the blast furnaces are almost finished, and the others well started. The coke ovens are about three-quarters complete, while the steel plant is well on the way to completion. The water works and railroad system are now ready. Work will be continued all the winter. Mr. Moxham says there was less time lost last winter than either during the spring or summer months, owing to the unusually good weather which prevailed. In answer to the question, where the bulk of the steel output would find a market, Mr. Moxham replied that the market would be practically the whole world, the United States included, so far as the export business was concerned. The American manufacturer gets a rebate of 99 per cent. of the duty on everything brought in for export purposes.

When asked how the Dominion Iron & Steel Co. would compete with manufacturers in the United States, Mr. Moxham said: "Our two closest competitors are Pittsburg and Birmingham. Theoretically, the latter is our closest competitor, but in actual practice it will be the former; and the reason is this, that Birmingham has not as yet gone far beyond the crude portion of steel manufacture, while Pittsburg has developed the industry to the utmost point of finished manufacture. If you want an exact comparison of relative advantages, I will try to give it to you. To manufacture one ton of steel in Pittsburg they have to carry two tons of ore over 230 miles of railroad and 1,000 miles of water. They have also to take two tons of coal, or its equivalent in coke, over sixty miles, and one-half ton of limestone over, say, 100 miles. Omitting the lake traffic, this is equivalent to 580 tons railroad miles; and, in addition to this, Pittsburg has to carry each ton of steel 450 miles to reach tidewater. Birmingham has the raw materials pretty well assembled, but the finished steel must be carried 600 miles before it reaches tide water. Against both of these places Sydney has about 400 miles of sea haul on iron ore, nothing whatever on coal, and nothing on finished material, because she manufactures at tide water. Nor is that all. Sydney is 1,000 miles nearer European ports than New York, and 3,000 miles nearer than Mobile, the shipping point for Birmingham."

Speaking of the question of government tariffs, Mr. Moxham said: "The Dominion Iron & Steel Co. could ship into the United States even for domestic use at a profit in spite of the tariff. The only thing that deters them from doing so is the consideration that more profitable markets exist elsewhere. In dollars and cents I would put Sydney's advantages at from $5 to $6 per ton over Pittsburg; and probably from $3 to $4 on Birmingham, Ala., that is measuring by export business in all three cases, and leaving out the question of government bounty."

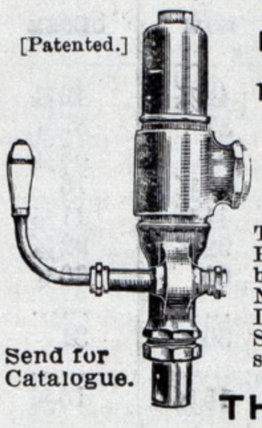
Mr. Moxham was then asked what he considered a fair profit on steel and he replied: "A perpetual guarantee of $2 per ton profit on the product would be handsome recompense to capital in the steel business." Mr. Moxham says that the town of Sydney is forging ahead rapidly, but along legitimate lines. Some 800 houses have gone up within the past few months. Next year there will in all probability be somewhere in the neighborhood of 4,000 men employed at Sydney and between 1,000 and 1,200 at the mines, which are some 400 miles distant from the town.

The Custom house at Bath, Me., has made its annual report of vessels (nearly all of wood) built in the district during the present calendar year. It shows that ship building in tonnage surpasses that of any year save 1882, when 42,000 tons were built. This year the total is 41,532 gross, or 35,561 net, distributed among thirty-five craft. The individual craft were as follows: One ship, gross tonnage, 3,292, net 2,887; four steamers, gross 850, net 474; fifteen schooners, gross 23,731, net 20,864; thirteen barges, gross 13,614, net 12,205; two sloops, gross 45, net 31; barge Hecla, 3,000 tons, to be launched Dec. 31.

THE FLUSHOMETER — THE KENNEY SYSTEM.

FOR FLUSHING WATER-CLOSETS.

[Patented.]



Send for Catalogue.

The best system ever invented for use on steam vessels.
No Cup Leathers or Springs.
Owners and Constructors of Steamships, Yachts and Steamboats have found it indispensable.

Showing application of Flushometer.

Used by the U. S. War and Navy Departments—Transports Grant, Sheridan, Burnside, Terry, Logan, Hooker, Thomas, Sherman and others. Also Albany Day Line Steamers, Norfolk & Washington S. S. Line, Steam Yachts Neaira, Aphrodite and Loando, and new Lake Steamers Illinois, Pennsylvania, Angeline, etc.

FLUSHOMETER TRADE MARK

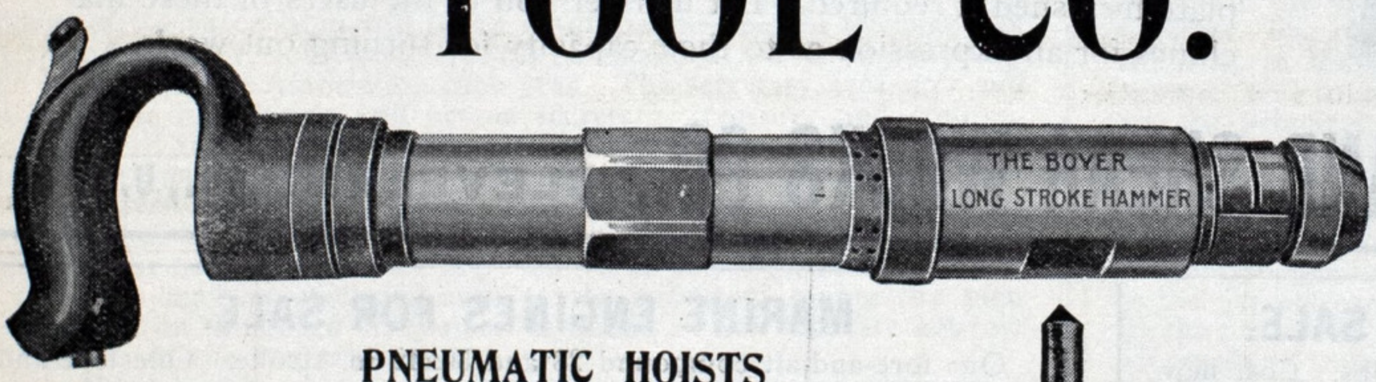
THE KENNEY CO., 72-74 Trinity Place, NEW YORK.

Paris Exposition, 1900, confers Highest Award and 2 Gold Medals ON CHICAGO PNEUMATIC TOOL CO.

(Only Gold Medals in this Class.)

HAMMERS
for Chipping
" Calking
" Riveting
" Beading
" Stone Cutting, etc.

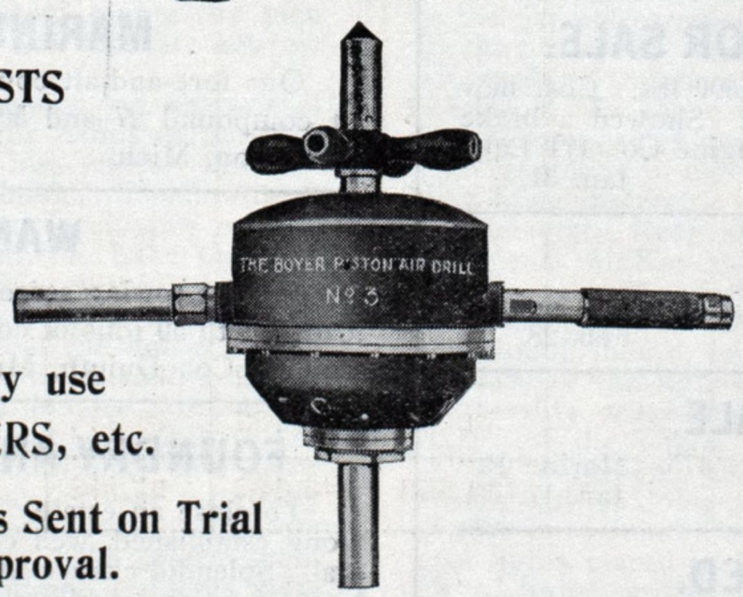
RIVETERS
for Shipyard use
" Boiler work
" Bridge work
" Structural work



DRILLS
for Railroads
" Mines
" Quarries
" Foundries
" Machine Shops
" Wood boring

FLUE { Welders, Expanders, Reducers, Rollers, Cutters

PNEUMATIC HOISTS
CRANES
JACKS (Car and Locomotive)
PAINTING MACHINES
MOTORS for every use
CASTING CLEANERS, etc.



Pneumatic Appliances Sent on Trial Subject to Approval.

By actual statistics 95% of all Pneumatic Tools sold all over the world are our tools.

UNITED STATES COMMISSION
TO THE
PARIS EXPOSITION OF 1900

PARIS 20 AVENUE RAPP — CHICAGO AUDITORIUM BUILDING — NEW YORK EQUITABLE BUILDING

PARIS OFFICES,

August 21, 1900.

Chicago Pneumatic Tool Company,
Chicago.

Gentlemen:

Officially I desire to inform you that your pneumatic tools received at the hands of the International Jury of Award, a Gold medal. Also that Mr. Boyer was awarded a Gold Medal as collaborator and inventor of the tools.

Yours very truly,
F. E. Drake
Director of Machinery & Electricity.

New York Office: 95 LIBERTY ST.

CHICAGO PNEUMATIC TOOL CO.

GENERAL OFFICES: Monadnock Block, Chicago.

BRANCH OFFICES: 418 Exchange Building, Boston, Mass. 241 The Arcade, Cleveland, Ohio. Binz Building, Houston, Texas. 316 Lincoln Trust Building, St. Louis, Mo. 1016 Carnegie Building, Pittsburg, Pa. 421 Market Street, San Francisco, Cal. 605 Fidelity Building, Philadelphia, Pa.

FOREIGN REPRESENTATIVES: The New Taite-Howard Pneumatic Tool Co., Ltd., General European Agents, 63 Queen Victoria Street, London, E. C. John Macdonald & Son, No. 9 York Street, Glasgow. Schuchardt & Schutte, Spandauer-Strasse 59-61, Berlin, Germany; Brussels, Belgium; St. Petersburg, Russia; Vienna, Anstria; Stockholm, Sweden. H. Glaenzer & Perreaud, 1 Avenue De La Republique, Paris, France and Spain. H. W. Peabody & Co., Sydney, New South Wales.

LARGE BLUE PRINT CONCERN.

The Elliott Electric Blue Print Co. of 723 Liberty avenue, Pittsburg, are distributing their new sample book "V" to consumers of blue print papers. It is a 3½x6¼-in. book and contains bona fide samples of the Elliott company's imported blue print papers and blue print cloth, as well as a complete line of blue printing apparatus, such as bath trays, frames, cars, erasing fluids, etc. This concern is the American representative of the Papeteries de Vidalon, whose mills are the oldest and most extensive in France, their blue print paper being chemically pure. The Elliott Electric Blue Print Co. purchased the business of the Mackey Co., Ltd., on May 1 last. They were unfortunate in having their plant destroyed by fire on June 29, but this caused the construction of an entire new plant and their factory and equipment is now the most complete in the country. In addition to manufacturing blue print papers, this concern represents a number of foreign mills manufacturing drawing, detail and tracing papers, and tracing linens, and carries everything in the drawing and surveying material line. Their new plant is also furnished with the latest style electrical and sun printing frames and they are now furnishing prints to city trade in Pittsburg day or night.

A majority of the stock of the Standard Seamless Tube Co., whose plant is located at Ellwood City, Pa., is now controlled by the National Tube Co. Offices of the Standard company have been removed from the Germania Bank building in Pittsburg to the offices of the National Tube Co. in the Conestoga building. The National Tube Co. had control previously of the United States seamless tube plant at Christy Park, Pa., and is now in a position to produce seamless tubing of any size from ½-in. o. d. to 16 in. o. d., of any practical gauge. The Standard Seamless Tube Co. was organized a little more than a year ago and is capitalized at $500,000. Experts regard the plant as one of the best equipped in the country and the drawing processes are covered by patents owned by the company. The chief output thus far has been marine and locomotive boiler tubes, although bicycle tubing is also manufactured.

VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland,
Date of January 9, 1901.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire	43	44½	42⅞	42⅞
American Steel & Wire, Pfd	87	87¾	87	87¾
Federal Steel	55¼	56⅞	55	55⅞
Federal Steel, Pfd	76	76	75¾	76
National Steel	41½	42⅛	41½	41½
National Steel, Pfd	93	93	92½	92½
American Tin Plate	61	61	60	60¾
American Tin Plate, Pfd	.....	.....	.....	.....
American Steel Hoop	30	31	30	31
American Steel Hoop, Pfd	.....	.....	.....	.....
Republic Iron & Steel	15⅞	16⅛	15⅝	15⅝
Republic Iron & Steel, Pfd	.....	.....	.....	.....

GARLOCK PACKINGS.

Made on the Right Principle.
Made for Service. Made for Durability.
Made for Economy.

Hence of practical utility.
Models of simplicity in use.
Used for a quarter of a century by thousands of careful engineers in every section of the world.
Highly recommended by **ALL** who have used them.
Beware of base imitations.
Unprincipled manufacturers try to imitate our packings, and are using our trade cuts to advertise their inferior goods.
Write direct to our nearest office, stating your wants, and they will be attended to promptly and faithfully.

Send for catalogue and samples to our nearest office.

THE GARLOCK PACKING CO.

NONE GENUINE — TRADE Garlock MARK — WITHOUT IT.

New York. Philadelphia. St. Louis.
Boston. Pittsburg. Denver.
Chicago. Cleveland. San Francisco.

MAIN OFFICES AND FACTORIES:
PALMYRA, N. Y.; ROME, GA.

Thearle's Works

ON SHIP BUILDING.

STANDARDS IN ENGLAND AND SCOTLAND

KNOWN AND USED WHEREVER STEEL SHIPS ARE BUILT.

SEPARATE VOLUMES FOR PLATES

"Ship Building in Iron and Steel."
(Plates in separate volume.) $5.25.

"Ship Building and Laying Off."
(Plates in separate volume.) $3.00.

"Theoretical Naval Architecture."
(Plates in separate volume.) $3.50.

THE MARINE REVIEW PUB. CO.,
CLEVELAND.

This illustration represents our

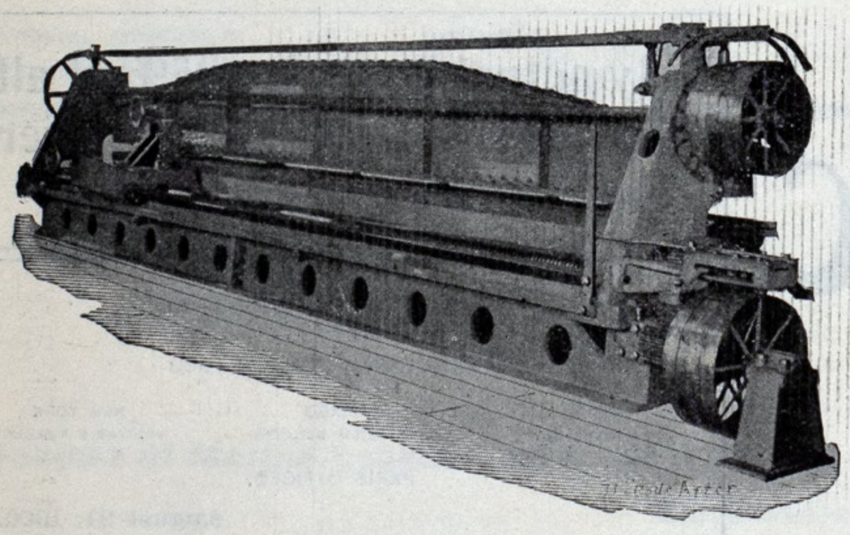


PLATE PLANER

having capacity to plane the edges of plates any size or thickness.

The cutter head carries two tools, one cutting in each direction. Shifting of tools is automatic. Cutter head is driven by a large square thread screw, working in a bronze nut.

Girder is raised and lowered by power. Jack screws for holding plate furnished if required. Let us refer you to the users of these machines for an expression as to their capacity for turning out work.

THE CLEVELAND PUNCH AND SHEAR WORKS CO., CLEVELAND, O., U.S.A.

WOLVERINE GASOLINE ENGINE FOR SALE.

Two cylinders, upright and of 47 H.P.; weight 5,500 lbs. Cost new $1,285. Used less than sixty days. In perfect order. Showed a brake test of 47 H.P. Spot cash price $675. Backus Gas Engine Co., 171 Lake street, Chicago, Ill. Jan. 31.

TUG FOR SALE.

Good Tug, six years old. Engines 18x20. Boiler allowed 130 pounds steam pressure. Address Box 284, Ashland, Wis. Feb. 28.

A 300-TON VESSEL FOR SALE.

In good condition. Will sell cheap. Address Box 475. Marine Review Pub. Co., Perry-Payne Building, Cleveland. Jan. 17.

NAPHTHA LAUNCH WANTED.

For delivery purposes in one of the harbors of Lake Erie. Address Box 411, The Marine Review Pub. Co., Perry-Payne Bldg., Cleveland, O. Jan. 10

BOILER FOR SALE.

Marine boiler 8½x16 ft. Allowed 109 lbs. of steam. Address E. G. Crosby & Co., Muskegon, Mich. Jan. 24

MARINE ENGINES FOR SALE.

One fore-and-aft compound 28 and 50x42 in. stroke. One fore-and-aft compound 27 and 50x40 in. stroke. Address E. G. Crosby & Co., Muskegon, Mich. Jan. 24

WANTED TO CHARTER.

For the towing season of 1901, a tug of about 200 H. P. which can be loaded with 50 tons of coal and will draw not over 10 ft. 6 in. Red Cliff Lumber Co., Duluth, Minn. Dec. 20, Jan. 3, 17.

FOUNDRY AND MACHINE SHOP FOR SALE.

To close an estate. Located in one of the large cities on the lakes. Long established, well equipped, doing good business, marine and general. Splendid chance for the right parties. Will sell plant or lease for a term of years. Address "Administrator," care Marine Review Pub. Co., Perry-Payne Bldg., Cleveland. tf.

FIVE ELECTRIC PASSENGER LAUNCHES FOR SALE.

In fine condition. Length over all, 35 feet. Seating capacity, 28. Send for price list. Yacht brokers, please note. Milwaukee Electric Launch Co., 1504 Monadnock Block, Chicago. tf